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American Gas Journal

100th Year

SEPTEMBER, 1958

Only Magazine Edited Exclusively for the Gas Distribution Industry

New Installation Ease, Safety and Convenience

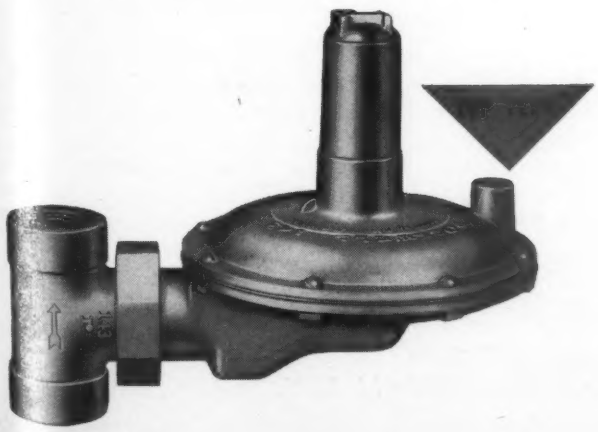
ROCKWELL "143"

Service Regulator

Now available with SIDE VENT COVER

Universal swivel connection permits rotating and locking the body at any angle with the pipe. The cover can be detached and turned so that the vent always drains downward.

ALSO AVAILABLE WITH TOP VENT



The safest service regulator you can buy is now the most adaptable, thanks to a new side vent cover. For those who prefer a top vent, this construction is also available.

For your peace of mind, the Rockwell "143" has an extremely high internal relief capacity. The lightweight, durable aluminum alloy body and cover ease handling. Get full facts now. Write for bulletin 1026. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

SERVICE REGULATORS

another fine product by

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new BLAW-KNOX GAS CLEANER

provides cleaner, drier gas ... increased capacity

From Blaw-Knox comes a new pace setting gas cleaner. Using all the proven advantages of oil scrubbing, the new cleaner incorporates unique design features developed out of 28 years of field experience. The same neat exterior has been retained to match existing facilities.

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You can cash in:

. . . by using this new cost cutting cleaner at your compressor stations, district regulators, town border stations or wherever highest efficiency is needed.

Contact Blaw-Knox today for the industry's most modern gas cleaner. Note your maximum hourly load, minimum pressure at peak, and maximum pressure for which your all-new cleaner should be designed.

BLAW-KNOX

BLAW-KNOX COMPANY

Buflovak Equipment Division
1646 Fillmore Avenue, Buffalo 11, N. Y.

Established 1859

American Gas Journal ®

ONLY MAGAZINE EDITED EXCLUSIVELY FOR THE GAS DISTRIBUTION INDUSTRY

September, 1958 **100th Year of Publication** Vol. 185, No. 9

CONTENTS

MANAGEMENT & OPERATIONS

AGJ Special Report:
Prosperity, Steady Growth, and Optimism 17

Gas distribution industry has weathered current economic storm in good fashion; favorable growth reported for first half of 1958, outlook optimistic for second half and 1959.

Dean Hale

Choosing a Peaking Gas Process 21

If you plan to peak shave, be sure to consider all of the economic and engineering factors involved for best results.

Robert Kyle and P. W. Havenstein

American Gas Fundamentals:
Estimating Gas Engine Service Revenues 27

D. C. Neill

LOAD BUILDING

Frontier City Goes Gas 30

Gas, naturally, does almost everything well, but here's a new superior use . . . attracting tourists!

John W. Dexter

Gas Air Conditioning Data Sheet:
Open Absorption Systems 32

Gas Helps Build Printing Presses 33

CORROSION

Corrosion Notebook:
Fundamentals of Rectifiers for Service Men 35

Knowledge of the essential uses and components of rectifiers is necessary for efficient servicing, installation and trouble shooting.

Earl L. Newmyer

CONSTRUCTION

Distribution Developments 38

News about current and planned construction

Growing Pains Big Task for Small Utility 43

Careful planning helps Delaware Gas Company maintain balanced program of expansion and maintenance.

FEATURES

MCF — News Hilites 3
Profile by Gas Light 5
Thomas H. Evans
Coming Events in the Gas Distribution Industry 9
Men at Work 10
American Gas Fundamentals 27
Corrosion Notebook 35
Distribution Developments 38
News About the Gas Distribution Industry 44
Bookshelf 45
Product Previews 46
Bulletin Board 48
Advertisers' Index 45

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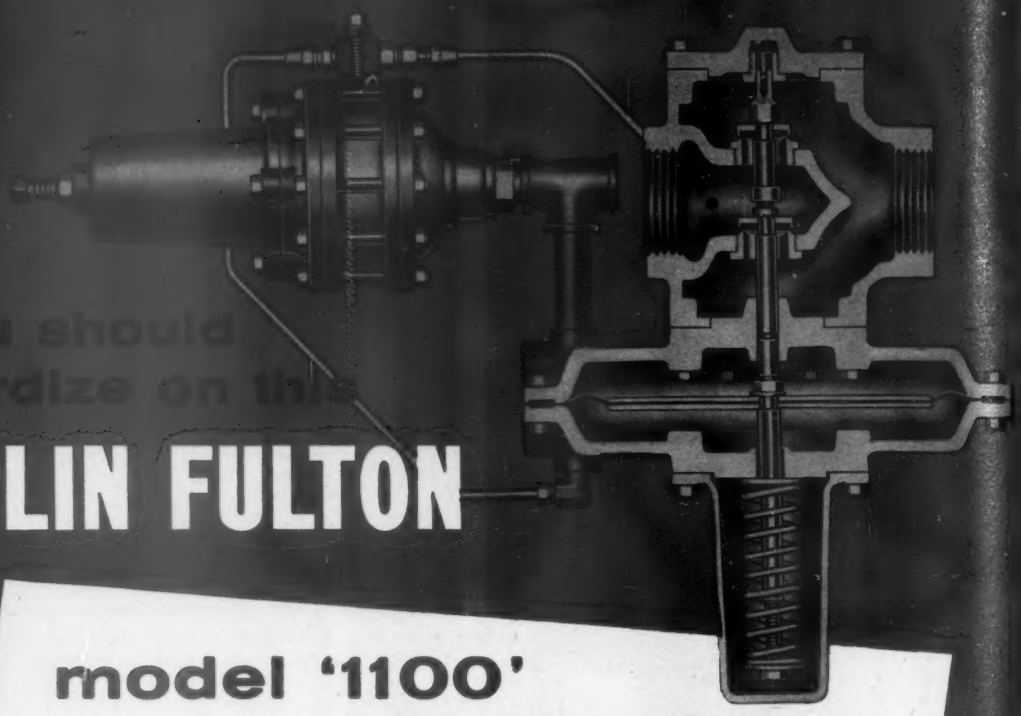

model '1100' gas regulator

Let's not beat around the well head, this Model "1100" is the most versatile gas regulator in the business. It gives a wider range of flow control in industrial, commercial or distribution installations. Just look at these points of superiority:

wider application
Inlet Max.—400 psi. Outlet Range 1" to 150 psi. Size—2" only, screwed, flanged 125 or 250 ASA

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24,000 cfh at 10 psi to ounces; 114,000 at 100 psi. Body contoured for flow

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Regulator or pilot can each be serviced without disturbing the other. Easily accessible orifices in both, quickly renewable

simpler installation
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the heart of model 1100

TYPE 51 VARIABLE PRESSURE PILOT

- Unitized construction—valve lever and orifice as a unit are removed from the outside, without disturbing balance of assembly. The likely trouble spot, the orifice, is outside where you can get at it quickly. No internal tubes to clog.
- Twin diaphragms remove as a unit
- Internal relief unit—guards against overpressure
- Spring unit—remove three screws to change springs
- Built for service
- Used for accuracy

Write for bulletin 1100

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Pittsburgh 25, Pennsylvania

American Gas Journal

Established July 1, 1859

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Mcf

Natural gas service will begin in September for citizens of Winnipeg when the first phase of a 20-year contract to deliver 200 billion cu ft goes into effect. Rates proposed by the distribution company, Winnipeg and Central Gas Company, have been contested by numerous parties and regulatory agencies have indicated they will set interim rates until all arguments for all sides are heard.

Offshore gas in Cameron Parish, Louisiana, isn't moving through one of the largest high-pressure underwater lines ever built. The producers, the CATC group, declined to sell the gas from the offshore wells at the price of 17 cents per Mcf set by the FPC calling it uneconomic. The purchaser, Tennessee Gas Transmission Company, had contracted for the gas at a 23-cent price. A court decision affirmed the 23-cent price, but the FPC is expected to appeal the decision. Meanwhile, Tennessee's expensive line lies idle. The producers are expected to stick to the contract price.

Export market for Canadian gas is essential, members of the Canadian Gas Association were told at their recent annual meeting at Murray Bay, Quebec. Immediate problem facing Canadian natural gas producers is development of markets that will provide a return on frozen investments already made and furnish funds for further utilization of Canada's gas reserves, according to E. D. Loughney, senior vice president of British American Oil Company, Ltd. Otherwise, he said, producers will be forced to cut back on their explorations and development.

India's government is intensifying its search for oil and gas following discovery of natural gas in commercial quantities at Jwalamukhi, in the Punjab. Drilling in the area has reached 6000 ft, with several rigs reportedly striking natural gas formations, and will be extended to 10,000 ft before exploring for oil starts. Three other areas are slated for exploration.

John B. Hussey, Shreveport, Louisiana, attorney who has specialized in oil and gas law and taxation for over 25 years, recently took the oath of office as the newest member of the Federal Power Commission. Hussey, a native of Texas and a graduate of Georgetown University, will serve a five year term, ending June 22, 1963. The new commissioner, who is 50, was Louisiana's Commissioner of Conservation prior to assuming the FPC post.

Authority to condemn unsafe gas appliances may be given to gas company employees by the city of Pittsburgh, Pennsylvania, under municipal legislation now being considered. The city's safety director, the gas companies serving the city, and other agencies are working on the proposal, by which either city or gas company inspectors could "red tag" unsafe appliances. Once tagged, the appliance could not be used until repairs are made or the appliance replaced. Violators would be prosecuted under the city building code.

The Gas Gazette, after 39 successful years of publication, has succumbed to the march of progress — specifically, the electronic accounting machine. The *Gazettte,* a monthly mailer included with bills sent out by Peoples Gas Light and Coke Company, enjoyed a circulation of almost 1,000,000 at the time of its demise. Conceived in 1919 as a "folksy" but newsy letter, it carried interesting and humorous items, editorials, recipes, information about gas and gas appliances, and news of important developments in Peoples Gas. In July, a new billing method — employing inexpensive, postcard style, punched business machine cards — took over, and the *Gazette* lost its covering envelope and basis for existence.

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For complete information on the Oronite Odorometer — facts about its construction and principles, operating instructions — contact the Oronite office nearest you. Or, ask for a demonstration of the Odorometer on your system.

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Calodorant® C — completely stable cyclic sulfide-type odorant
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Calodorant® B-1 — a sulfide odorant at a mercaptan price
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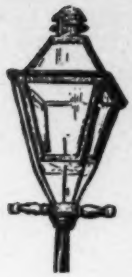
Profile by Gas Light



Tom Evans: Super Salesman and Civic Leader

IT'S A GOOD THING for the gas industry that Tom Evans doesn't work for an electric company. If he did, the energy he generates would probably be enough for that company's entire power supply — and then what would happen to the low-cost feature of gas?

'Tis said that the dynamic vice president in charge of sales for Equitable Gas Company of Pittsburgh **lives** the gas business 24 hours a day. But if that's so, he must be sneaking in a few extra hours somewhere to devote himself to his favorite project: The betterment of the city of Pittsburgh through civic activities.

Even his sales staff will swear that he secretly lengthens each night so he can read and bring in stacks of industry and business magazines (each underlined in strategic places) for everyone to read the next morning.

However, he does it — *he does it.* And the gas industry as a whole benefits. The big ex-basketball star is a picture of power, and he applies the same power to all his activities, whether they are company, American Gas Association, or civic.

His whole life has been one of hard work, and he's as much at home inside a steel mill as he is in a University of Pittsburgh classroom, where he studied business administration.

Take his AGA work, for example. Extremely active in the national group during his 20 years in the industry, Tom has always been guided by what he feels is the bright future of the gas industry.

Let pessimists beware!

"There is no place in our industry for pessimists. We're getting bigger, better, and more modern all the time. I've got great faith in our industry," he declares.

He shows that faith by belonging to 10 important AGA committees, including the Residential Gas Section, of which he was recently nominated chairman. He is also chairman of the National TV Commercial Committee Section and the General Public Information Planning Committee.

It took a lot of fortitude and dogged determination to push through sponsorship of *Playhouse 90* at a time when it was an unknown quantity. To the groups that took the big gamble and won handily, Tom brought the same fortitude that carried him through the South Pacific battlefields, winning him a commission, Bronze Star, Purple Heart and Cluster, and four battle stars.

Thomas H. Evans

The gas industry isn't the only recipient of his dynamism, however. Pittsburgh is in the midst of a *Renaissance* program, which will highlight a lengthy Bi-centennial celebration later this year. As a member or an officer of a dozen or so groups around the city, he is one of the driving forces behind the *Renaissance.*

Probably his greatest civic interest lies in the *Pittsburgh Civic Light Opera,* of which he is vice president and a member of two committees.

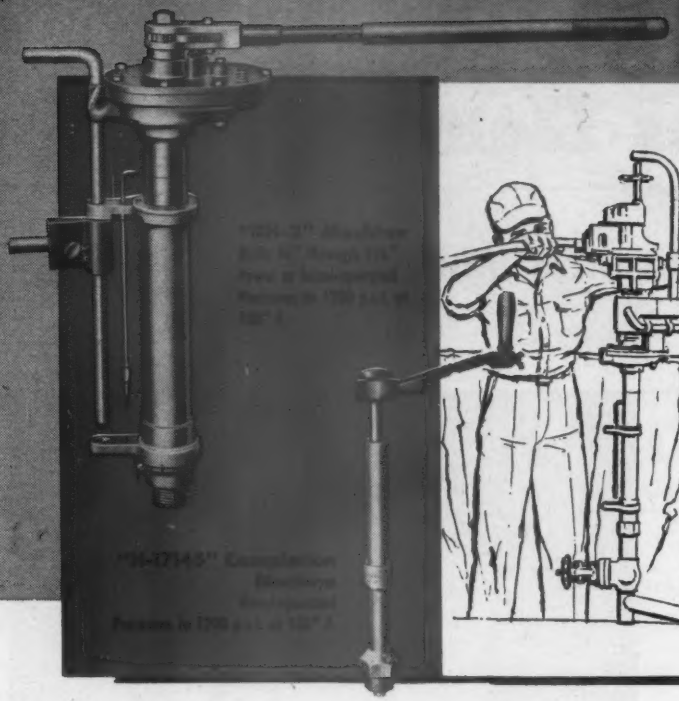
"Civic Light Opera makes it possible to see all the Broadway musicals at half the price of a Broadway show ticket without making the trip to New York," he said. "We bring in excellent New York casts, and make this music available to the citizens of the community."

The box office doesn't pay the freight, though, and the non-profit Civic Light Opera has to have the additional financial support of corporations and foundations. This in itself might be a problem in many communities, but the businesses in the Pittsburgh area are pretty excited over the *Renaissance* themselves, and they have been solidly backing the musicals.

The villain in the plot is the weather. Played outdoors at the Pitt Stadium, the shows have fallen victim to one of the rainiest summers in history. For instance, 7.3 in. of rain fell in Pittsburgh in July as compared to a normal 3.8 in. As you read this, it is probably still raining in Pittsburgh!

Damp but undaunted, Tom Evans continues beating the drums for the Light Opera in newspaper offices, radio and TV stations and in the ears of the City Fathers. The result has been excellent cooperation from all.

Whether he's boosting sales at Equitable Gas, bringing new prestige to the gas industry, or sparking Pittsburgh's *Renaissance* drive, Tom Evans epitomizes the word "salesman." Some people still have a suspicion, however, that he sneaks a few extra hours into each day.



Drill the main

All Mueller drilling machines may be used to make main-to-service connections. Here the "DH-2" Machine is power-operated to drill the main through a tee. It may also be hand-operated. The "DH-2" drills only. Its companion machine, the "H-17145", is used for the following operations.

- **Insert and extract completion plugs in tees, drilling nipples and line stopper fittings.**
- **Insert and extract stem and bushings in tees and valves.**
- **Insert and extract stems in tees and valves.**
- **Recondition body seats in valve tees and steel valves.**

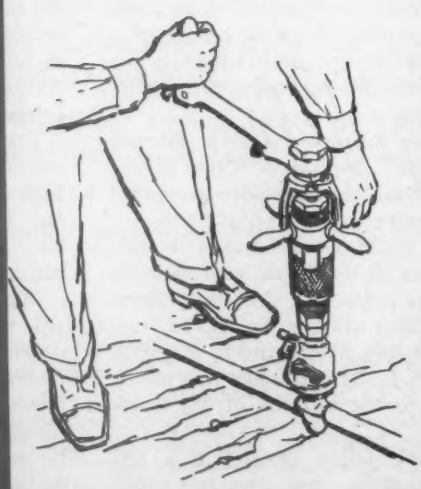
USE MUELLER® DRILLING MACHINES SAFELY UNDER PRESSURE!

Mueller "E-4", "EH-1", "D-4", "DH-2" and "T" Drilling Machines are usually used for making main-to-service connections by drilling through tees or stops.

But these machines have many other important applications and uses that do not always involve drilling. They are the basic machines used to perform the many different NO-BLO® operations.

These No-Blo operations, which were developed by Mueller Co. for the gas industry, permit service connections, transfer of services, repairs, replacements and a host of other tasks to be done in a controlled manner. All work is done safely and simply—under pressure—without escape or blowing of gas.

A few of these operations—and the machines that may be used—are shown.



Stop-off lines

The illustration shows the handy "E-4" Machine used with a service line stopper fitting to stop-off lines for repairs, replacement, modification or transfer of services. This versatile machine will also perform all other No-Blo operations, such as:

- **Drill the main through tees, stops, drilling nipples and line stopper fittings.**
- **Insert and extract completion plugs in tees, drilling nipples and line stopper fittings.**
- **Insert and extract stems and bushings in tees and valves.**
- **Insert and extract stems in tees and valves.**
- **Recondition body seats in valves tees and steel valves.**
- **Stop-off service tees.**

Insert plugs

An especially convenient machine to use on smaller size fittings is the "T" Machine. Here it is being used to insert—or extract—a completion plug in a tee. Although the "T" Machine will perform all of the No-Blo operations, a companion machine, the "H-17045", may be used to speed completion operations.

Recondition seats

Here the "D-4" Machine is refacing the body seat of a curb valve tee. This is done under pressure without removing the tee from the line. It is also used for this operation on valve tees. Basically, the "D-4" is a larger version of the "E-4" and will perform the same No-Blo operations.

NO-BLO®

Contact your Mueller Representative or write direct for Booklet No. 5 for more information on the many applications and uses of Mueller No-Blo Products and Equipment.

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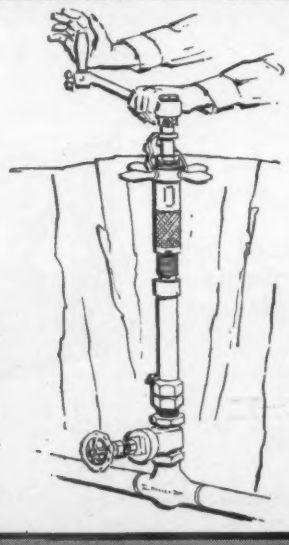
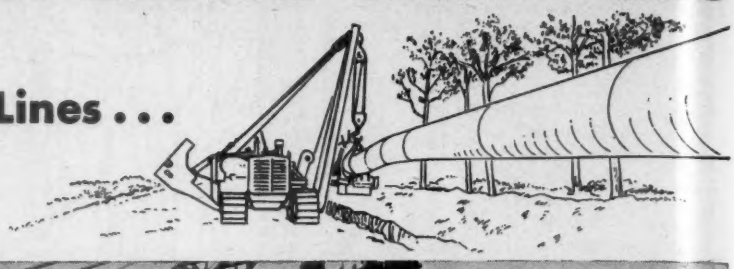


Extract stems

The balanced pressure "EH-1" Machine, which retains the "feel" of the tool even at high pressures, is shown extracting the stem from a No-Blo Steel Valve. The "EH-1" will perform the same No-Blo operations as the "E-4", but under much higher pressures.

PITT CHEM PIPELINE ENAMELS

Proven on the "Big Inch" Lines . . .



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MANY of the nation's major gas transmission lines are protected from underground corrosion with *Pitt Chem* Coal Tar Pipeline Enamels. No other material can *begin* to match coal tar's *proven* record of economical, long-lasting protection.

So make a point to specify this *same* guaranteed protection for your distribution lines. *Pitt Chem* Pipeline Enamels are your *best* assurance against pipeline failure which can be extremely costly, particularly in metropolitan areas.

Pitt Chem Enamels are manufactured by a basic producer, and are rigidly quality-controlled at every step of production to meet *published* specifications. • Call on a *Pitt Chem* man to help you plan *your* next distribution line protection program. He's fully equipped to give you valuable technical assistance . . . and to guide you to long-run protection economies.

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PROTECTIVE COATINGS • COAL CHEMICALS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Coming Events

IN THE GAS DISTRIBUTION INDUSTRY

September

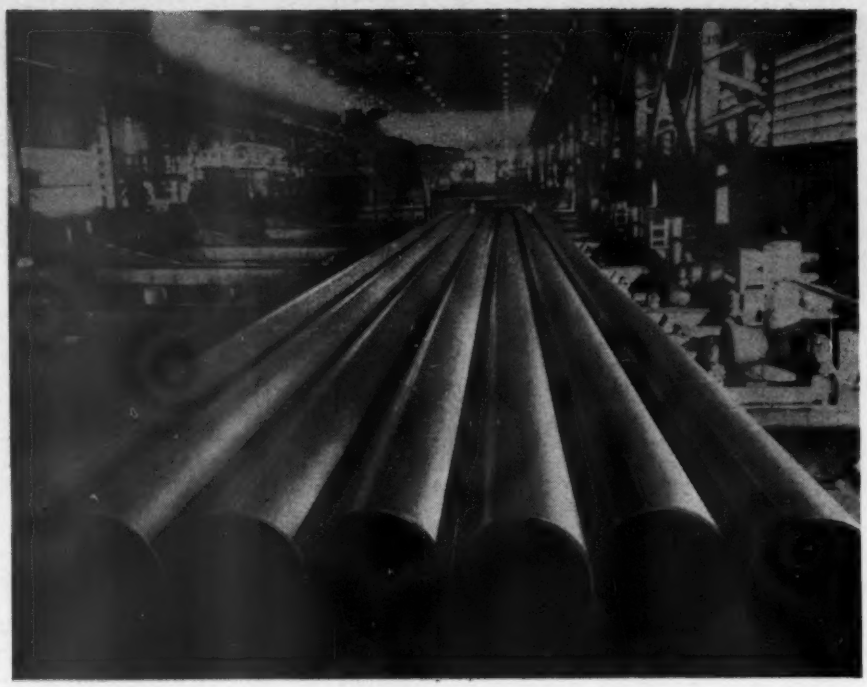
3- 5 PCGA annual convention, Benson, Imperial and Multnomah Hotels, Portland, Oregon.
5 New Jersey Gas Association, annual meeting, Berkeley Carteret Hotel, Asbury Park, New Jersey.
11 NEGA safety conference, Sheraton Plaza, Boston, Massachusetts.
12 NEGA commercial industrial heating division, Wachusett Country Club, West Boylston, Massachusetts.
16-17 AGA 10th annual accident prevention conference, Sheraton-Seelbach Hotel, Louisville, Kentucky.
17-19 Southeastern Gas Association, annual meeting, Sir Walter Hotel, Raleigh, North Carolina.
19 Oklahoma Utilities Association gas division conference, Biltmore Hotel, Oklahoma City, Oklahoma.
25 AGA Great Lakes PR workshop, Cleveland, Ohio.

October

9-10 National Noise Abatement Symposium, Hotel Sherman, Chicago, Illinois.
10 NEGA, heating group of C-H-I division, Publick House, Sturbridge, Massachusetts.
13-15 AGA, annual convention, Atlantic City, New Jersey.
15-16 Gas Measurement Institute, sponsored by University of Kansas and Southwest Kansas Petroleum Industry, National Guard Armory, Liberal, Kansas.
15-17 Wisconsin Utilities Association electric and gas sales operating convention, Hotel Schroeder, Milwaukee, Wisconsin.
17 NEGA, industrial group of C-H-I division, Sheraton-Biltmore, Providence, Rhode Island.
20-24 National Safety Council, Chicago, Illinois.
20-24 NACE, annual conference and exhibition, south central region, Roosevelt Hotel, New Orleans.
21-22 Purchasing Workshop Conference, Illinois Institute of Technology, Chicago, Illinois.
22-24 Air Conditioning & Refrigeration Wholesalers, annual meeting, Sheraton-Palace Hotel, San Francisco, California.
23 AGA Mid-West PR workshop, Hotel Sheraton-Martin, Sioux City, Iowa.
24 Oklahoma Utilities Association accounting conference, Burlingame Hotel, Bartlesville, Oklahoma.
29-30 Computer Applications Symposium, sponsored by Armour Research Foundation, Morrison Hotel, Chicago, Illinois.
30 NEGA operating division, Sheraton Kimball Hotel, Springfield, Massachusetts.
31 NEGA accounting division, Statler Hilton Hotel, Hartford, Connecticut.

November

17-19 National Fire Protection Association fall conference, Pittsburgh, Pennsylvania.
18-20 American Standards Association, Hotel Roosevelt, New York, New York.
19-21 Mid-West Gas Association gas meter and service school and conference, Iowa State College, Ames, Iowa.



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Gathering, distribution and transmission lines.. using Lone Star API line pipe.. give trouble-free service month after month and year after year.

Every length of Lone Star pipe is subjected to the API hydrostatic tests in length of time and degree of pressure. Yes, Lone Star is rigidly quality-controlled from mining of ore to finished pipe. Lone Star fully normalized casing, tubing and line pipe are made strictly to Joe Roughneck's standards.

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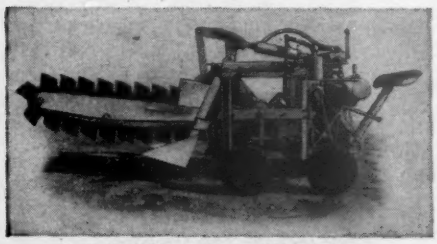
WITH A
Pow-R-Ditcher

Model 4T Pow-R-Ditcher

You'll **make** more money . . . you'll **save** more money when you dig with the rugged Vermeer 4T Pow-R-Ditcher. Just the machine for laying gas pipe, service lines and for digging foundation footings. Very maneuverable, the 4T Pow-R-Ditcher is only 48" wide, 6' high, 13' long. Digs 6" to 14" wide and can be transported in a pickup truck. A one man self-propelled unit. Thousands in use. The low price will amaze you!



Model W-2 Pow-R-Ditcher

The baby of the Vermeer line, the W-2 digs 2½" to 4" wide, 3' deep at 1' to 10' per minute. Fine for small trenches, for gas and electrical service and shallow water lines. Rugged, heavier-built, self powered and inexpensive.

Write for complete information, literature and low prices on the complete Vermeer Pow-R-Ditcher line . . . or see your nearest Vermeer dealer.

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MANUFACTURING CO.
1451 W. WASHINGTON • PELLA, IOWA

Men At Work

IN THE GAS DISTRIBUTION INDUSTRY

● **Edward A. Allen** has been appointed promotion manager of Milwaukee Gas Light Company. He was formerly with Cramer-Krasselt advertising agency.

● **Rolf R. Colpitts** has been appointed manager of the industrial and commercial sales department of Northern Ontario Natural Gas Company Limited. He heads a department responsible for selling natural gas to large plants, mills, and commercial establishments located from Kenora to Orillia. Formerly, Colpitts was in charge of industrial and commercial sales, and gas utilization.

● Four promotions in the gas engineering department of Columbia Gas System Service Corporation have been announced: **Lowell L. Elder** and **Robert S. Ryan** have been named supervisory engineers. **Robert R. Wright** and **Robert M. Forrest** have been named assistant senior engineers.

● **Martin E. Lavens** has been appointed manager of the builder division of Philadelphia Gas Works, succeeding **George W. Miller,** who is retiring after 43 years of service. Lavens comes to PGW with 23 years background in the engineering and sales consulting fields. He will head a staff of builder contact representatives working out of the sales department.

● **T. J. Hull** has assumed his new duties as executive secretary of the National Association of Corrosion Engineers. **R. W. Huff, Jr.** has become assistant executive secretary, succeeding Hull who had been assistant executive secretary the year preceding. **A. B. Campbell,** formerly executive secretary, retired in March.

● **Walter K. Wilson** has been added as a public relations account executive on the Pittsburgh headquarters staff of Ketchum, MacLeod & Grove, Inc. He was formerly a member of the information department staff of the Pittsburgh group companies of Columbia Gas System.

● Heath Survey Consultants, Inc. has announced the promotion of **Stuart B. Eynon** to vice president in charge of operations. He will be in charge of all Heath field survey operations for utilities and municipalities.

● **Lewis L. Dollinger, Jr.** has been named president of Dollinger Corporation of Rochester, New York, succeeding **Lewis L. Dollinger, Sr.** who steps up to chairman of the board. Dollinger, Jr., was formerly vice president and sales manager.

● **M. S. Miranda,** director of public relations and advertising, Dresser Industries, has been elected chairman of the board of the National Industrial Advertisers Association at the association's 36th annual conference. Miranda succeeds **R. C. Sickler,** product group manager, advertising department of E. I. du Pont de Nemours & Company, Inc.

● **David J. Kerr,** director of business development, Southern Union Gas Company, has been elected president of the Blue Flame Merchandising Council of Dallas. Named vice president of the organization was **Russ Karpenko,** Minneapolis-Honeywell Regulator Company, Dallas. Re-elected secretary-treasurer was **K. E. Herrmann,** W. A. Green Company, Dallas. New directors include **Earl Fuson,** Metalbestos Division of William Wallace Company, **Kenneth N. Watkins,** Lone Star Gas Company, and **Robert M. Erskine,** Cribben & Sexton Company, all of Dallas.

● **John Seale** and **Brownlee Fiveash** have been appointed new air conditioning representatives of Alabama Gas Company's re-juvenated program to promote use of gas-fueled central air conditioning equipment. The company formerly merchandised Servel equipment until 1952 when a change in the policy of the Servel Corporation forced discontinuance of this activity.

● At Equitable Gas Company, **Joseph F. McManus** has been promoted to planning engineer and **Donald P. Sutton,** has been promoted to assistant distribution engineer. Sutton will be responsible for preparing cost estimates and deciding the size of gas lines to be laid in areas previously without gas.

● **Chris H. Pedersen** has been promoted to gas superintendent of Pacific Gas and Electric Company's East Bay Division. He succeeds **Thomas P. Jenkins** who was appointed manager of the Humboldt Division at Eureka. **John Bianucci,** division gas engineer of the East Bay Division succeeds Pedersen as gas superintendent at Stockton, and **John G. Smith,** distribution engineer in the San Francisco general office assumes Bianucci's duties in Oakland.

● **John C. Wallace** has been appointed to the new position of vice president, operations, of the Walworth Company. He will be in charge of the company's manufacturing, engineering, and development activities.

● **Gilbert N. Bell** has been appointed general sales manager of Sprague Meter Company. He formerly supervised the activities of Sprague's sales personnel in the field.

● To consolidate recent diversification and expansion, Southwestern Industrial Electronics Company, a Division of Dresser Industries, Inc., has announced several staff appointments and promotions. They are: **Warren C. Dunn,** from Union Switch and Signal Division of Westinghouse Air Brake, to assistant to the executive vice president. Heading each area of SIE interests in the position of product managers are **Louis B. McManis** (geophysical division), **Frank C. Smith, Jr.** (instrumentation division), **Newton E. Armstrong** (control division), **Robert L. McCelvey** (government contract division), and **Albert B. Dustin** (inter-company and heavy manufacturing division).

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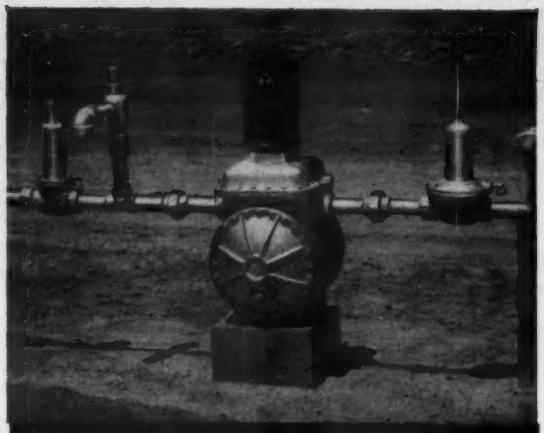
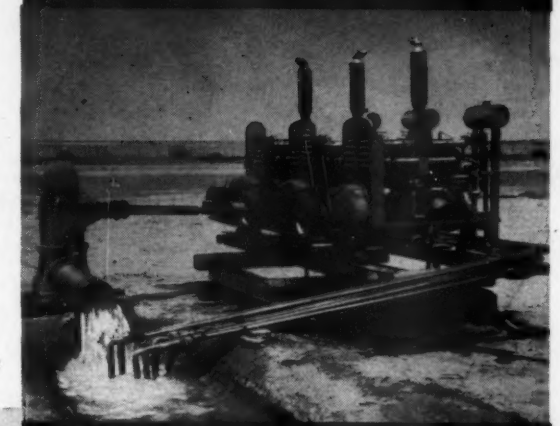


Base Pressure Index on American 25B Ironcase Meter, and Type HPR-10 and HPR-20 Reliance Regulators are installed at each well. Meter-regulator sets are standardized for maximum economy.



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Personals

● Southern California Gas Company has elected a new member of the board of directors and a new vice president. General attorney **H. P. Letton, Jr.,** has been elected a board member, and **H. A. Proctor,** presently manager of engineering, has been elected vice president in charge of engineering and transmission. Proctor's promotion and subsequent managerial assignment changes have resulted from the recent move of vice president **Grove Lawrence** to the Pacific Lighting Gas Supply Company.

● Southern Union Gas Company has re-elected the following to its board of directors — **Wofford Cain, Scott Hughes, J. C. Reid, J. Glenn Turner** and **C. H. Zachry,** all of Dallas; **Thornton Hardie, John MacGuire** and **Lee Moor** of El Paso; and **F. W. Denius,** Austin. Officers of the company reappointed by the board are: **Wofford Cain,** chairman of the board; **C. H. Zachry,** president; **J. C. Reid,** executive vice president and general manager; **Scott Hughes,** first vice president; **Willis L. Lea, Jr.,** vice president and general attorney; and **H. V. McConkey,** secretary and treasurer. Others are **J. R. Cole III,** vice president, Santa Fe, New Mexico; and **William Lawlor, Jr.,** vice president, Austin.

● **Alexander Dreisin** has been appointed chief engineer, fuel injection department, of Allis-Chalmers Manufacturing Company. He was formerly chief engineer of the Micromatic Hone Corporation's micro-precision division at Evanston. Allis-Chalmers recently acquired certain assets of this particular divison.

● Brooklyn Union Gas Company has announced the promotion of **Anne Miseyko** to director of its home service section. Miss **Ruth B. Soule,** former director, is taking an early retirement after 33 years of service.

● **C. Wallace Cederberg** has been elected a director of the Brockton Taunton Gas Company. He is treasurer, general manager, and director of the Larson Tool & Stamping Co., and was formerly a director of the Taunton Gas Company prior to its merger in 1952 with Brockton Gas Light Co.

● **William W. Babcock,** vice president of Central Illinois Light Company, has been elected a director succeeding **James A. Brown** who has been named director emeritus after 28 years of service on the board.

● **Louis E. Schmidt** has been named general auditor of Equitable Gas Company. He will be in charge of general accounting, payroll and stores accounting, and customer accounting.

● Three promotions in the Ohio Fuel Gas Company organization have been announced. **Harold W. Haught,** local agent at Oberlin, has been promoted to local manager at Berea, and **M. E. Vernon,** Lorain division accounting supervisor, has been named to succeed Haught at Oberlin. **D. P. Potts,** local manager at Berea, has been named superintendent of a new Ohio Fuel service building near Parma.

● **John H. Caldwell** has been promoted to assistant sales manager, Protective Coatings Division, Pittsburgh Coke & Chemical Company.

● **Donald V. Hackett** has been appointed gas market manager for Dresser Manufacturing Division, Dresser Industries, Inc. He will manage sales of Dresser piping products to the gas industry. Hackett was formerly district manager-gas for Dresser in Chicago and replaces **A. Newton Zahniser,** resigned.

D. V. Hackett

M. B. Rojtman

● **Marc B. Rojtman,** former executive vice president, has been elected president of the J. I. Case Company. **John T. Brown,** former president and chairman, has been re-elected chairman of the board.

● **Charles E. Smith,** former assistant national service director, has been appointed national service director of Robertshaw-Fulton Controls Company. He will be in charge of R-F's program of traveling training schools for instructing utility and dealer service personnel in installation, maintenance, and repair techniques. He will also administer the national network of franchised service and repair shops.

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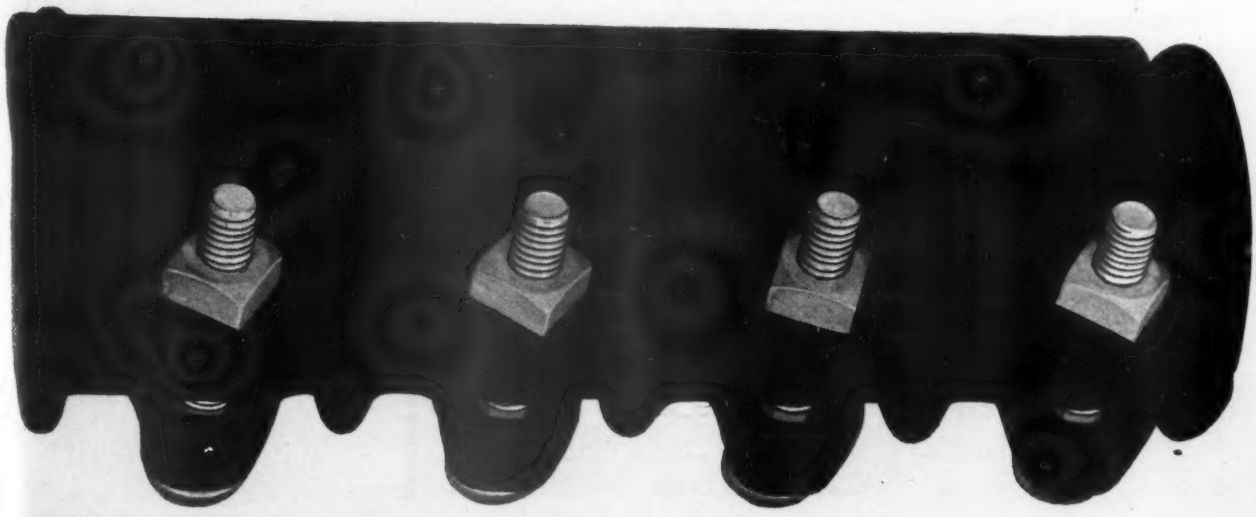

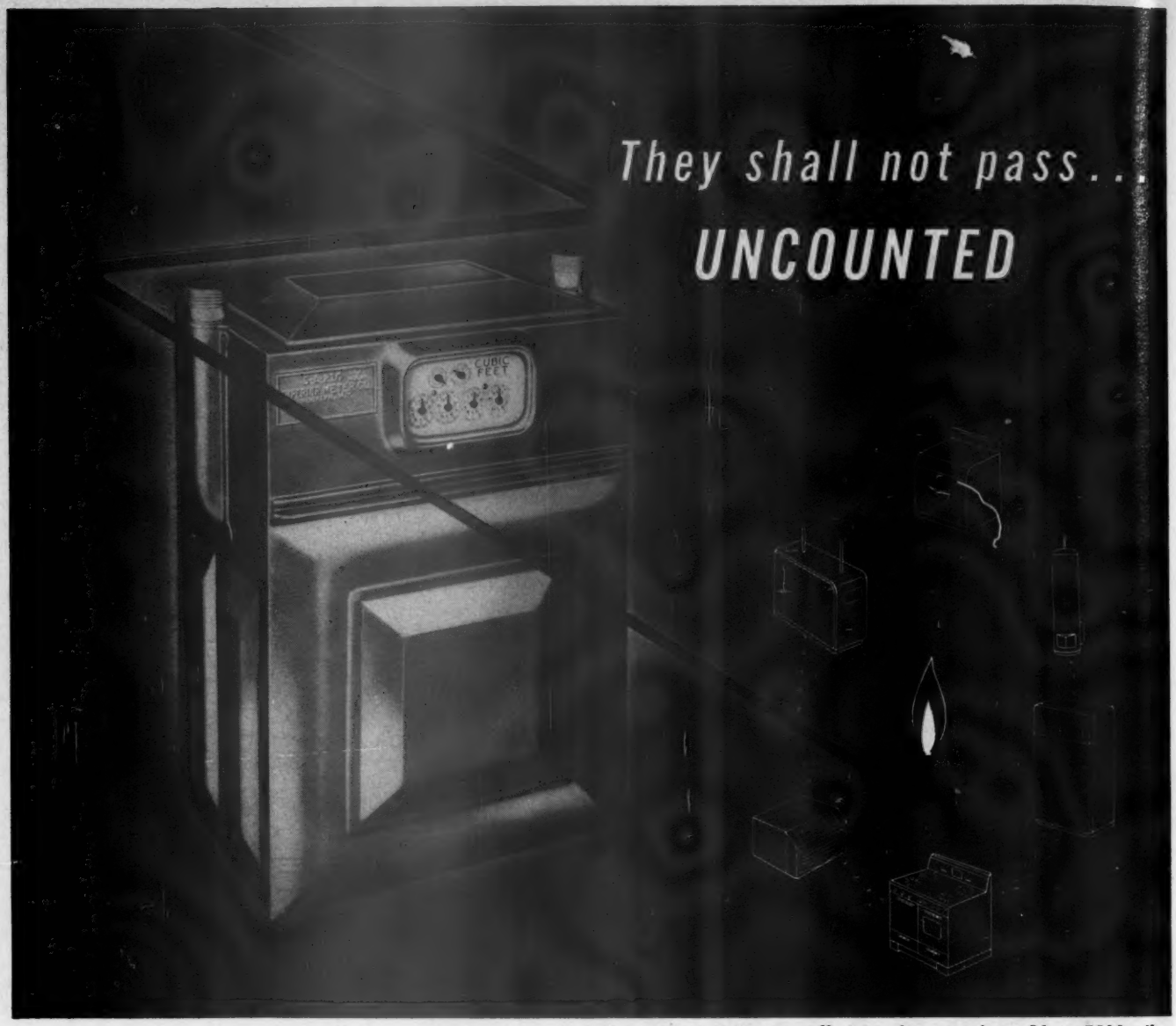

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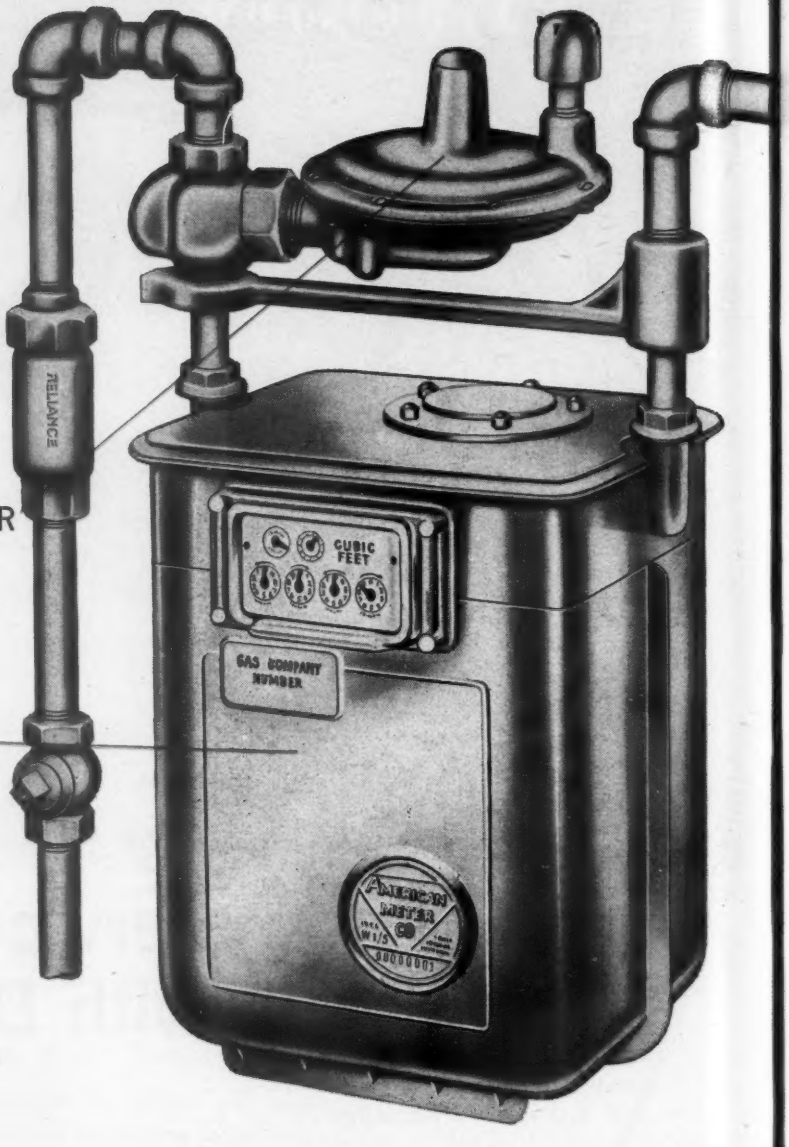

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An AGJ Exclusive Report:

Survey Shows Distribution Industry Prosperous, Growing and Optimistic

Rise and fall of thermometer proves better gage of gas utilities' economic health than economic barometer; companies report favorable growth in first half of '58, see upturn in economy in last half

Dean Hale, *Editor*

RECESSION? You won't find one in the gas distribution industry. Gas sales are up. Revenues are up. Expenditures for construction of new mains, services, and other facilities are up. More customers are being added and the growth in load continues upward.

Summed up briefly, the gas distribution industry has weathered the current economic "storm" in good fashion and the industry is optimistic about the future.

To find out what effect the "business slowdown" has had on the nation's gas utilities, AMERICAN GAS JOURNAL polled distribution companies of all sizes in every section of the country.

Respondents to the survey told us — with few exceptions — that their operations were normal or above normal. Effects of the "business slowdown" varied from region to region and company to company. Most of them were attributable to changes in the national economy.

Measuring the Patient's "Health"

There are several "indicators" that provide a yardstick for measuring the economic condition of the gas utilities. These formed the basis for the survey. They include comparisons (with previous years in specified periods) of residential sales, commercial sales, industrial sales, rate of new meter connections, collections, and construction of new facilities.

Replies to these specific inquiries, plus comments from the companies on their current condition and their outlook for the coming months provided the basic information for this "diagnosis" of the gas distribution industry's "health."

In the accompanying table is a summary of detailed replies furnished by 33 of the respondents. Many other companies were not able to provide current statistics on their first half of 1958 operations in time for this report. Their comments, however, are included in the text of the report.

A Few "Pains" Reported

Like any other industry, the gas utility business reflects changes in the national economy, even though the industry's individual changes may be small.

Highly debatable is the question of whether the current business slowdown is a "recession" or just a "leveling off" of business activity. Much depends on what industry you are in.

One top gas industry executive may have pinpointed the problem: *Everyone expects the economy to keep going up; we have become so accustomed to this that any trend toward a slowing of the pace brings sounds of alarm. Adjustment is difficult to tolerate.*

Whatever form the adjustment is taking, changes in certain phases of national economic activity have had some effect on gas distribution operations. These include:

New home construction, a source of load growth for many gas utilities, has been down in the first half of 1958. But housing construction is picking up in many areas, according to economic indicators, and should continue to do so throughout the balance of the year.

Heavy industry has been cut back in production. This has reduced industrial sales, but hasn't eliminated them. The loss has been principally in the automotive, steel, metalworking, and hard goods manufacturing industries. These, too, show signs of regaining lost ground.

Consumer resistance to purchase of hard goods — particularly automobiles and appliances — has been responsible for most of the reduction in heavy industry operations. It has had some effect on appliance sales by those gas utilities that merchandise appliances. But it has not materially affected gas sales.

Utilities are rarely affected by "business slowdowns." Utility services are necessities; people may reduce expenditures for luxury items, or as in the case of a few hard-hit areas, they tighten up on their mode of living. But such services as the use of gas — for cooking, heating, hot water, etc. — continue pretty much at the normal demand rates.

Thermometer Is Clue to Cash Register Ring

Much more important to the gas distribution company is the thermometer. It is a much better gage of a company's economic status than is the Federal Reserve Board's index of manufacturing.

When winters are colder than usual, the gas utilities prosper. If the winters are warmer than usual, net income can suffer almost directly with the decrease in degree days.

The winter of 1957-58 was colder than usual throughout all parts of the U. S. except for certain areas of the Rocky Mountain region and the Pacific Coast. A major city on the Gulf Coast, for example, had 1499 degree days in the 1957-58 winter season, compared to a "normal" winter of only 892.

This colder weather has been reflected in higher gas sales (therms and/or Mcf) and, consequently, higher revenues. Yet, even when sales and revenues are adjusted to "normal" winter conditions, sales and revenues reflect gains over the previous winter seasons.

Growth: Slower, Perhaps, But Steady

Fluctuations in general business activity, however, cannot be overlooked for they do have some effect. Just how much has the "business slowdown" affected the companies surveyed? Replies, such as these that follow, fairly well establish regional conditions.

Northeast: *There has been no slowdown as far as gas sales are concerned. Building, particularly home building, has slowed down to approximately 50 percent of the peak construction in 1956. Industrial construction has slowed approximately 60 percent. Other increases in gas load, however, have more than made up for any decreases in construction.*

Southeast: Despite the "business slowdown," our operations are continuing at a pace comfortably ahead of last year and all previous years. Year-to-date residential gas sales are up 51.17 percent over the comparable period of

Quick Summary of the Gas Distribution Industry

As It Sees Itself at Mid-Year, 1958

Company	Size*	What has been effect of the "business slowdown" on your company so far?	Comparison of sales, first half of '58 with first half of '57			How do collections compare with 1957?	How does your 1958 construction program compare with 1957?
			Residential	Industrial	Commercial		
NEW ENGLAND, NORTHERN, AND EASTERN STATES							
Company #1	★★★	Very little. New home starts off.	up 10%	up 4.1%		Slower and tougher.	Approximately same. Workload stable.
Company #2	★	Very little. Housing off.	up 40%	up 34%	down 4%	Slower but not serious.	Activity lower. Have had natural gas for 5 years and pace nearing normal.
Company #3	★★	Growth slowed. Industrial sales off.	up 17%	down 15%	up 19%	Slower and more difficult. Many customers paying "on acount" instead of "in full."	More dollars, fewer feet of pipe.
Company #4	★★★	Gas sales good. New building down.	up 10.8%	up 31.5%	up 7.6%	Better. Have fewer uncollectibles.	Fewer dollars, more feet of pipe. Using more company crews on construction.
Company #5	★★★	No measureable effect.	up 28%	up 30%		Good. People can pay and willing to do so. No problem here.	Have a "normal" program this year. 1957 was peak expansion year.
Company #6	★★★★	Very little. Appliance sales good.	up	up	up	Collection rate about normal.	Construction at high level. Expanding to new areas; should continue thru 1959.
Company #7	★★★	None. Area economy is stable.	up 21%	up 20%		Normal or better. Some accounts slow but sure. Cold winter, high bills.	Program identical with 1957. Expansion essential to growth.
Company #8	★★★	Slight. Rate of growth bit slower.	up 20%	up 9%	up 13%	Collection on delinquents difficult.	Same as 1957 and 1956. Using fewer contractors. Workload is stable.
Company #9	★★★★	Gas sales good. Area economy down.	up 15%	up 2½%	up 6½%	More delinquents. Uncollectibles up some.	Activity down from 1957. Housing starts off and extensions fewer. Other work stable.
NORTH CENTRAL AND MIDWESTERN STATES							
Company #10	★	Growth slower but steady.	up 12%	up 6.75%		No noticeable effect on collections seen.	Expenditures less than 1957, but same as 1956.
Company #11	★★	Very little.	up 5.3%	up 8.9%		Good. Past due accounts ratio lower than in 1957 for same period.	Somewhat less than 1957 but not due to economic activity.
Company #12	★★★★	Hardly any. Supply is problem.	up 10%	up 9%	down 6%	Good. Some change in slow pays. Fewer accounts being written off.	Expenditures up 24%, pipe footage up 29%. Using more contractors.
Company #13	★★★	Very little if at all.	up	up	up	Collections normal.	Construction at high level. Extensive plans for future to meet increasing demand.
Company #14	★★	Total sales up despite reduced industrial sales.	up 15%	up 14%	up 18%	Somewhat slower but good.	Expenditures up 11.2%, pipe footage down 4%. Continuing to expand.
SOUTHEASTERN AND SOUTHERN STATES							
Company #15	★	Very slight.	up	up	up	Normal.	Construction activity is up 20%.
Company #16	★★	Very little. Area economy is in good shape.	up 44%	up 25%	up 42%	Slower. Due, perhaps, to larger heating bills. Bad debts up some.	Expenditures up 25%, pipe footage up 18%. Use company crews and workload is stable.
Company #17	★★★	Comfortably ahead of 1957 and all previous years.	up 51%	up 14.5%		Collections are normal	Construction is up 35% and keeping us busy. Using more contractors.
Company #18	★	None.	up 84%	down 9%		Collections off about 20%.	Program is essentially same as 1957.
Company #19	★	Very little.	up	up	up	No great change noticed.	Have quite extensive program for 1958 and 1959. All crews busy.
GULF COAST AND SOUTHWESTERN STATES							
Company #20	★★★★	Very little. Growth is steady	up	up	up	Delinquencies are up some, but not alarmingly.	Dollarwise, construction in 1958 is up 62% for distribution projects.
Company #21	★★★	Very little.	up 54%	up 8%		Delinquent rate up; so are uncollectibles.	Expenditures for construction up about 16% over 1957.
Company #22	★★★	None. Too busy to consider it.	up 20%	down 1%		Collections compare favorably with prior periods.	Will lay 20% more pipe in 1958 than in 1957; expenditure will be about same.
Company #23	★★★	Business normal. Housing starts off.	up	up	up	Collections appear normal.	Same as 1957. If housing construction picks up, program will be accelerated.
Company #24	★★	None. Agricultural area and economy is in good shape.	up 25%	same	up	Somewhat slower. Cold winter brought higher heating bills.	Construction activity is about same as 1957 or slightly above.
Company #25	★★★	None. Have gains in every phase of operations and sales.	up 21%	up 5%		Very good.	For year, will spend about 19% more than in 1957.
Company #26	★★★★	None. New highs in every area.	up	same	up	Slight increase in uncollectibles.	Expenditures for construction are up 50% over 1957.
Company #27	★★★	Very little if any.	up	up	up	Good. Making extra effort to collect delinquent accounts.	Approximately same as 1957.
ROCKY MOUNTAIN AND WESTERN STATES							
Company #28	★	None. Good crops in an area predominantly agricultural.	up 9%	same	same	Collections normal.	Program for 1958 about same as 1957 in dollars and footage.
Company #29	★★★	No material effect. Building construction is up.	same	up 20%		Indications are that collections are a bit slower but good.	Work is up about 8%. Company crews do most of construction; use contractors at peak times.
Company #30	★★★	No major changes. Industrial sales down.	up 6%	down 13%		Slower. Delinquents up about 10%.	Overall program about normal. 1957 was a peak year for expansion.
Company #31	★★★★	Very little. Some industries off from peak activity.	up	up	up	Some increase in delinquencies but payment good.	Activity is same or bit higher than 1957. New homes big factor.
Company #32	★★★★	Business good. Chief problems are rate cases, surplus of competitive fuel oil.	up	up	up	Somewhat slower.	About same as 1957.
Company #33	★★	Economy good. Weather biggest problem.	up 29%	up 47%		Less than 1% increase in arrearage.	Already ahead of budgeted figure due to spurt in new housing. Activity should continue high for long time.

* Key to size classification: ★★★★ Over 500,000 meters; ★★★ 100,000 to 500,000 meters; ★★ 25,000 to 100,000 meters; ★ Less than 25,000 meters.

1957 and 37.47 percent over the comparable 1956 period. One reason for the much greater increase this year, of course, was the protracted cold weather we had in January and February.

Southwest: *At the midway point in 1958, our company had registered gains in nearly all phases of its business, as compared to the same period of previous years.*

Rocky Mountain area: The "business slowdown" has affected our company very little, if any. We attribute this to the section of the country we serve and to the fact that most of the towns we serve are agricultural trading centers in areas where crops have been exceptionally good.

Pacific Northwest: *Most noticeable effect of the so-called "business slowdown" is that large industrial gas users have reduced their operating time and, thus, their gas consumption. With natural gas still less than two years old in our service area, new customers in all categories are constantly being added. Our greatest problem has been the weather. Last winter and thus far this year, temperatures have been 17 percent above normal, resulting in greatly reduced demands. A return to average temperatures would be welcomed by all fuel suppliers in the Northwest.*

North Central: We were faced with no assurance of increased supplies of natural gas during 1957 and, because we felt we had a duty to serve the public, we installed a new propane-air plant for producing substitute gas that is being further enlarged during 1958. Our faith has been amply justified and I can answer by saying that the business slowdown has simply "slowed down" our rate of growth, but that growth continues nevertheless.

New England: *The "business slowdown" has retarded our growth. New building starts have been fewer, appliance sales reduced, and our industrial gas sales have been cut back appreciably.*

South: Because of the extremely cold winter during 1957-58 and a 7.75 percent overall rate increase, our gross revenue and net profit is at an all-time high. It is difficult to determine how much the "business slowdown" has affected our operations. We did lose one large industrial customer who closed the local plant because it was one of the oldest plants, and therefore, the least efficient. We have had very little employee turn-over, and better qualified applicants for jobs that have opened. We are being more generous in our ratio of estimated revenue to cost-of-construction for new main construction in order to obtain new customers. We are continuing an aggressive sales promotion program in order to obtain and maintain our share of the local business.

East Coast: *The "business slowdown" has had no measurable effect upon our gas operations. The effect on industry in our area was very mild and, in the case of our gas operations, was completely absorbed by the strong trend toward gas heating.*

Midwest: The so-called "business slowdown" has had little effect upon this company's operations. In the first place, the industrial load is moderate compared to more concentrated service areas. For the 12 months ended June 1958, unit gas sales revealed an increase of 10.3 percent over the same period a year ago.

Collections: Slow But Good

Collections of customer accounts provide an interesting and important "indicator." Increases in delinquent accounts and in uncollectible accounts reflect to some degree the economic condition of customers. But changes in paying habits aren't always due directly to paying ability or customer income.

Quite a number of factors were cited by the survey respondents for changes in collections of accounts. A summary of the national picture is shown in the table, and the following comments from companies surveyed provide further explanation:

South: Collections have been slower during 1958, but it is difficult to say how much of this is due to "business slowdown," and how much should be attributed to large bills due to the extremely cold winter or a 7.75 percent increase in rates effective August 1, 1957.

Midwest: *No noticeable change seen in payments.*

East Coast: Total dollar delinquency has increased over last year by 3.78 percent. Believe this is a combination of two factors: One, a substantial increase in dollar volume of our service accounts, and two, some slow-up in the payment of customers' accounts, not due to inability to pay, but rather to recession talk. Customers are just loath to part with their money.

Central: *Collections during the first six months of 1958 have been somewhat slower than during 1957.*

New England: Collections in 1958 are slower and more difficult than they were in 1957 and 1956. Collections in 1957 and 1956 were not troublesome. The ratio of uncollectible accounts has not grown in the same ratio as the dollar sales increase. We now find many customers paying on account rather than in full.

Southwest: *Customer payments are coming in normally and are not noticeably slower than last year.*

No Slack in Construction

Construction activity in the gas distribution industry remains at a high level. Nothing in the replies given by respondent companies indicates reduced activity. Nor is there any sign that the pace will be reduced this year or in 1959.

Reduced activity in new home construction has slowed construction of new mains and extensions in some areas, but the slack has been taken up by work on reinforcement of systems, replacement of older mains, and similar programs.

Some companies report they are using more company crews for construction work, and buying newer, more modern equipment to enable the crews to operate more efficiently. Other companies report they are using more contractors to keep abreast of construction requirements.

Expenditures, on the whole, are equal to or higher than 1957 figures. This reflects increases in material and labor costs. Pipe footage, as laid, is the same or slightly higher as 1957. Most construction programs are planned toward future needs and are not easily affected by short-term economic fluctuations. Comments on construction activity include:

Southwest: The company's budget for distribution construction as approved for 1958 is approximately the same as in 1957 and 1956. All of our construction work is done by our own employees and equipment and is not contracted. Our construction crews are approximately the same size in manpower as in prior years.

East Coast: *Gas distribution construction has approximated $3,000,000 in each of the six month periods — 1956, 1957, and 1958, and between 50 and 60 miles of main has been laid in each of these periods. We are using fewer contractor's gangs, but approximately the same number of company gangs as in 1956 and 1957.*

South: Our construction program for expansion of our facilities is anticipated to be higher by approximately 20 percent compared with last year.

Northeast: *We are using the same number of contractors and the same number of company crews now as in 1957. Work loads are very stable.*

East Coast: Our construction schedule for 1958 is very nearly identical with the 1957 construction expenditures. We have made no change in the ratio of work performed by company employees and outside contractors.

North Central: *Workloads of company crews continue to*

expand as the company grows with respect to customers and areas served. We are using the same number of contractors as we did in 1957.

Southwest: Our construction budget for 1958 is at an all-time high.

No "Crash Programs" to Cut Costs

To make a profit, especially since they are subject to regulation by various governmental agencies, gas utilities must operate as efficiently as possible. While a "business slowdown" may emphasize the point, keeping operating practices efficient and economical is a continuing policy of the gas distribution companies.

Awareness of this fact is reflected in comments from the companies themselves:

New England: Closer scrutiny of operating expenses and a general tightening-up have helped hold the line. More efficient methods have been installed in the commercial office, and the purchase of certain new construction machinery is enabling us to cut costs on work formerly subcontracted.

Southeast: *Keeping all expenses at a minimum is a continuing project and policy of management of this company.*

Northeast: It is always necessary to reduce operating expenses, and we are continually seeking methods to accomplishing this. With increased labor, material, and money rates, combined with sharply increasing local property, school, sales, and utility taxes, it is absolutely necessary to operate just as efficiently as possible to avoid rate increases. It is a constant battle.

Midwest: *Continuing study to determine possibilities and operating economies is a built-in feature of supervisory responsibility.*

East Coast: We have not had to reduce operating expenses as a recession measure. In fact, the increased volumes of space heating load has required a natural expansion in our customer service forces. Of course, the control of operating expense is a constant effort.

Southwest: *We constantly seek to develop more efficient and economical operating methods and practices. This is standard with our company and not recession-induced.*

Rocky Mountain area: We have reduced advertising and sales promotion expense somewhat, and we are concentrating on cutting lost and unaccounted for gas to a minimum. However, this is not a direct result of "business slowdown."

New England: *We have reviewed our various operations, installed Kardex equipment with the view of eliminating duplicate calls, and cut back on overtime where possible. We are endeavoring to utilize our manpower and motor vehicle fleet more effectively.*

Outlook: Optimistic

Faith in the continuing development of the areas they serve, and optimism about the outlook for both the immediate and distant future was noted by every respondent.

The picture, nationally, can be seen in these comments:

South Central: *This company has been too busy to consider that there has been or that there is presently any "recession." The company adopted an aggressive policy of diversification and expansion in the year 1957 and this policy is being diligently pursued.*

North: Return of "normal business activity," we believe, is dependent upon the automobile industry, since we are located in Michigan. It is my personal opinion that automobile sales will pick up with the introduction of the 1959 models this fall and that the fourth quarter will be "normal" for the automobile industry and that they will sell between five and five and one-half millon automobiles in 1959, which I would consider normal. I think a large part of the current "recession" was occasioned by the automobile manufacturers trying to produce and sell over six million cars a year.

Southwest: *Our company along with other utilities — and all business for that matter — is, of course, faced with the continuing spiraling inflation of the present puzzling economy. We believe the remedy may be simply stated but not so simply attained. Improved economy of operations and increased sales! We're diligently striving for both. A continuing economy program practiced throughout the system is helping to offset general increases in operating costs. An accelerated business development program is geared to helping increase gas sales.*

Southeast: We do not acknowledge that our business has been "below normal," therefore could make no prediction about a return of "normal business activity."

Pacific Northwest: *The impetus of natural gas has insulated this company from any severe shock due to the current "business slowdown." The company is adding customers and load at a satisfactory rate. A return to normal weather conditions would eliminate the majority of our problems. An upturn in business conditions should increase our rate of growth. I would not be surprised to see this adjustment take place during the next six months.*

Central: Despite the so-called "recession," all towns served by our company continue to grow. Several of the major industrial plants served by the company are related to the steel and automotive industries, therefore normal operations in these plants will depend on national economic trends.

New England: *As to the future, we look forward to substantial gains in all areas, perhaps not as spectacular as in the past few years, but steady sound growth in sales and earnings.*

Gulf Coast: The level of our distribution business thus far this year indicates that there is no reason to be pessimistic as to the long-range outlook for a sound and steady growth.

Rocky Mountain area: *In this area of the country we have not experienced a recession similar to that of the Middle West and East.*

East Coast: In our territory, it would be hard to find a period that could be truly labelled as one of "normal business activity." This has been one of the most rapidly growing areas in the country since the end of World War II. This 15-year period, however, should be considered normal and the reduction from the hectic pace of new home construction is not viewed by us as a "recession." On the contrary, we think our area will continue to grow for many years to come, although we hope the pace is less rapid than it has been over the past 10 to 15 years.

Midwest: *Leading indicators show promise of "normal business activity" by early 1959. The impact of the adjustment has been milder in this area compared to other parts of the country.*

East Coast: Our view of the future is an optimistic one and we have no reason to believe our excellent rate of growth will not continue.

North Central: *Business activity is about "normal" at the present time. It should not be overlooked that the country has been enjoying a relatively long period of sustained "above normal" business activity. A review of the levels of business activity in this country for the past 100 years will make it clear that business activity goes through more or less regular cycles and that the best measure of "normal" business activity is probably somewhere near an "average" level of business activity. It is certainly a serious error to consider "peak" level of business activity as "normal."*

Northeast: Based on our gas, electric, steam, and merchandise sales, and from employment data in our service area, it appears there is a slight upturn from the rather small business recession that has prevailed in this area. We expect this increase in business to continue, barring international complications.

* * *

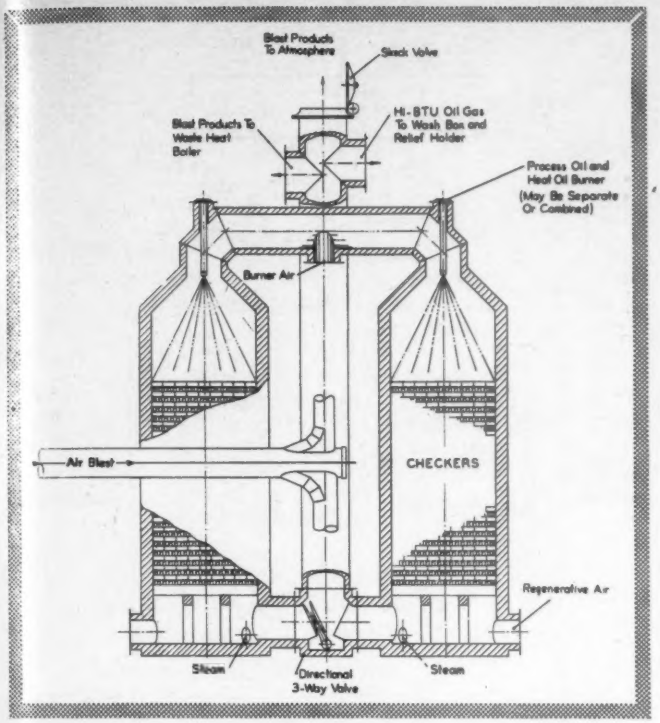

FIG. 1. Two-shell regenerative oil-gas set universal operation with light or heavy oils.

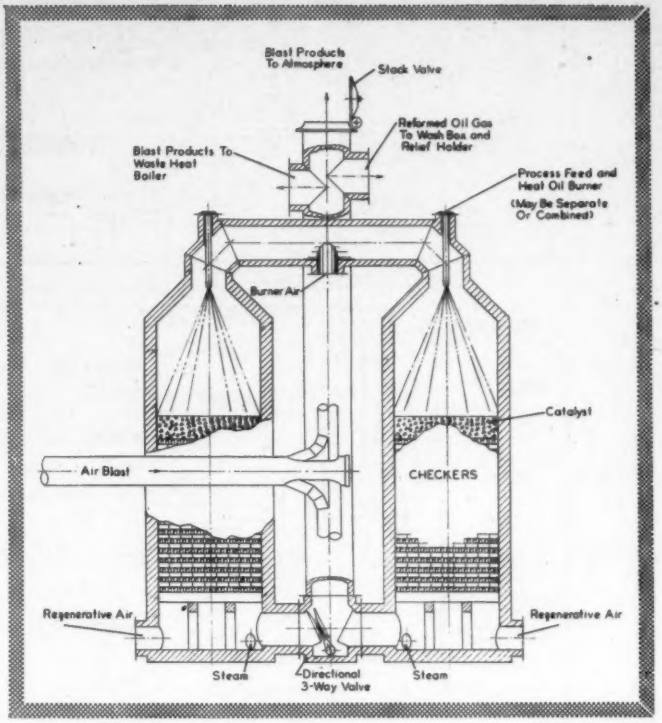

FIG. 2. Two-shell regenerative oil-gas set for catalytic gasification.

Planning to do some peak shaving? Then you should consider these engineering and economic factors before . . .

Choosing a Peaking Gas Process

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THIS ARTICLE IS WRITTEN PRIMARILY FOR THE MAN WHO HAS DECIDED TO PEAK SHAVE. It is not intended to explain the reason for peak shaving nor to justify the decision, but for the man who is still a little bit on the fence about whether or not to install peak equipment, the information in this article may well offer some encouragement — encouragement to meet the peak shaving problem head on.

Having so decided, the supposed difficulties begin to fade away and solutions appear — easy solutions, too, because we are in an age of automatic control and the modern chemical engineering approach.

Factors to Consider

First, of course, the maximum daily demand and number of full days (equivalent) operation must be determined in terms of the sendout gas or the natural gas equivalent. The information to follow actually represents a peak equipment study for one operating utility needing a peak generating capacity of 10,000 Mcf per day natural gas equivalent (at 1000 Btu per cu ft). Annual peak gas production is expected to extend through ten 24-hour days.

Plant equipment is to be located on available utility property, but at present unimproved, with no existing production equipment and no existing holder. A main natural gas feeder passes through the property at 100 psig, some distance away and downstream from the city gate station.

A peak plant of this size and type can be considered quite typical. Almost the same factors would prevail if the capacity were 5000 Mcf per day or 50,000 Mcf per day or 100,000 Mcf per day. Total annual peak gas production, however, related to total gas sendout, or the number of days' peak operation, would affect selection to some degree.

Types of Processes

In this study, seven processes of gas manufacture have been selected as being representative of what is available to the industry.

Process A is Hi-Btu oil gas using a heavy oil with approximately 12 percent conradson carbon. Process B is Hi-Btu oil gas made from light gas-oil. The Hall AGA Process type of equipment is recommended for A and B, either in a four-shell or two-shell arrangement. Fig. 1 illustrates a two-shell regenerative set built for the Hall Process.

Process C is Hi-Btu oil gas with catalyst using a light hydrocarbon feedstock such as naphtha or kerosine.

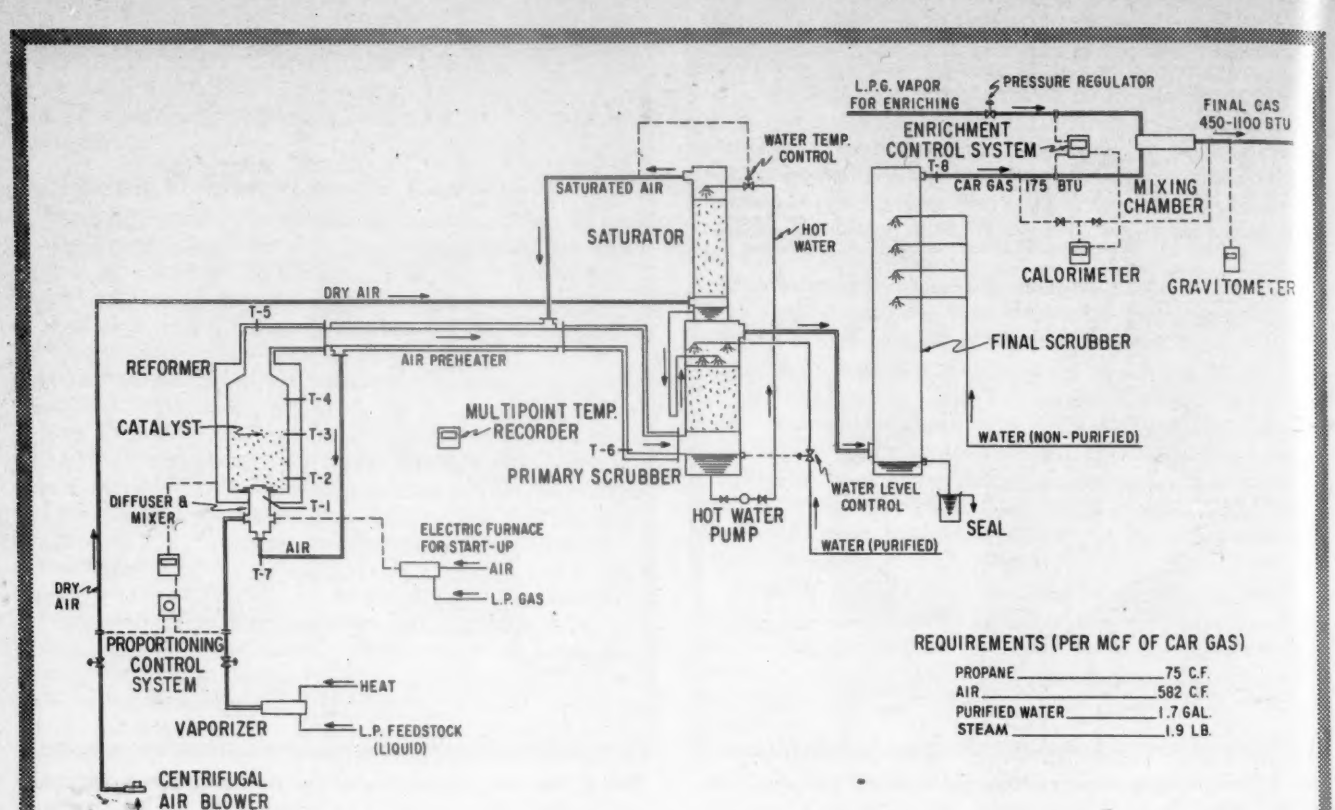


FIG. 3. Flow diagram of catalytic autothermic reformer (continuous catalytic autothermic cracking) CGCF Distrigaz process.

Table 1

Gas from Liquid Fuels — Estimated Operating Costs Per Mcf

(Fuel Prices F.O.B. Boston — December, 1957)

Process Btu/CF as made Feedstock	A 1050 12% C Oil	B 1050 Gas Oil	C 1050 Naphtha (Kerosene)	D 1000 Naphtha LP	E 1110 LP	F 1440 LP	G 1000 Naphtha
Gals. per Mcf generated (total)	14.4	12.6	12.1	3.3	12.3	15.8	9.0
Gals. per Mcf enrichment	—	—	—	8.2	—	—	1.1 (LPG for H_2)
Price per gallon	7.2¢	11¢	12.5¢ (11.1¢)	12.5¢ 10.75¢	10.75¢	10.75¢	12.5¢ 10.75¢
Steam lbs/Mcf (total plant)	140	120	80	50	25	20	20
Per 1000 lbs.	70¢ (B.C. Oil)	$1.00 (No. 2 Oil)	$1.00	$1.00	$1.00	$1.00	$1.00
Cost of Feedstock	$1.037	$1.386	$1.512	$1.294	$1.322	$1.698	$1.262
Cost of Steam	.098	.120	.080	.050	.025	.020	.020
Power at 1.5¢ KWH	.040	.040	.030	.030	.020	.010	.010
Purification Supplies	.030	.015	.005	—	—	—	—
Miscellaneous Supplies	.018	.015	.010	.010	.008	.005	.020
Compressor Power	.060	.060	.060	.060	.045	.030	—
Maintenance	.025	.015	.035	.030	.018	.008	.020
Operating Labor (Table 2)	.075	.075	.064	.054	.043	.021	.043
Total Direct Expense/Mcf	$1.383	$1.726	$1.796	$1.528	$1.481	$1.792	$1.375
Total Direct Expense/1,000,000 Btu	1.320	1.645	1.700	1.528	1.320	1.245	1.375
Tar and Oil Credit	—.430	—.270	—	—	—	—	—
Loss of Revenue	.095	.095	.095	—	.200	.610	—
Net Cost 1,000,000 Btu	$ .985	$1.470	$1.795	$1.528	$1.520	$1.855	$1.375
ANALYSES:							
Heating valve Btu/cf	977	1010	1000	1000	1000	1440	1070
Specific Gravity	0.83	0.80	0.81	0.77	0.97	1.29	0.64
CO_2	4.8	2.4	5.0	3.6	4.5	—	0.2
C_nH_m	25.7	25.3	30.0	30.9	35.5	57.6	26.9
O_2	1.6	0.8	0.8	0.1	0.1	8.8	—
CO	1.2	0.3	10.8	17.8	9.8	—	—
H_2	13.6	11.4	22.4	42.3	23.5	—	29.3
CH_4	30.5	38.5	23.0	3.2	0.5	—	43.0
N_2	22.6	21.3	8.0	2.1	26.1	33.6	0.6

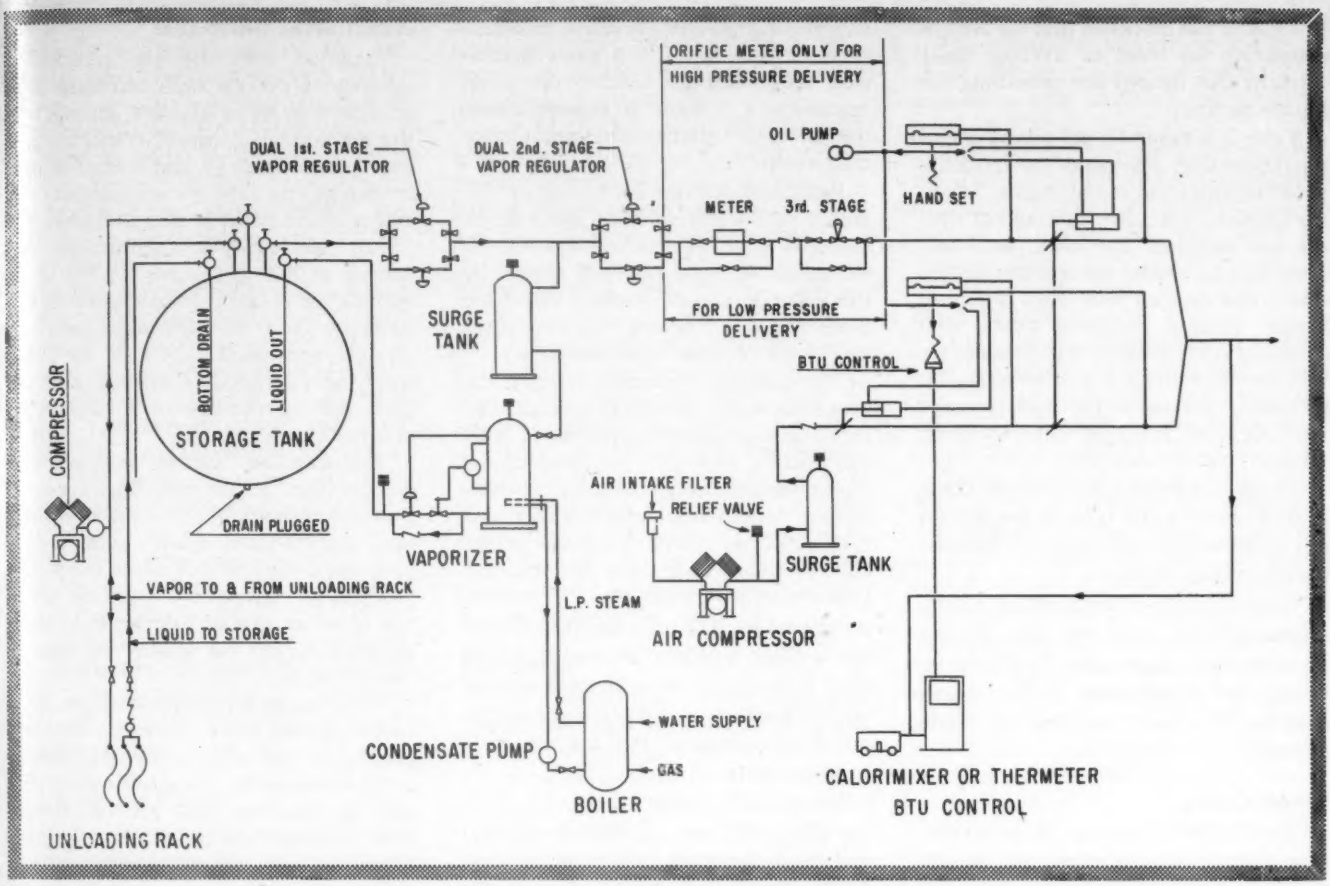


FIG. 4. Schematic of typical LPG-air plant, Btu control type.

Process D comprises low gravity, low heating value reformed gas made from a light hydrocarbon feedstock and enriched with propane. Regenerative, catalytic gas making sets are recommended (Fig. 2) for either C or D with automatic enriching control for Process D.

Processes A, B, C, and D are all cyclic. The remaining three processes considered are all continuous. Process E is catalytic autothermic reforming at 50 psig, employing light hydrocarbon feedstock to produce a low heating value, high specific gravity gas that is enriched by propane (Fig. 3). Process F is LPG-air at 100 psig (Fig. 4). Process G is pressure hydro-gasification, using propane for catalytic cracking to produce hydrogen and gasifying a light hydrocarbon feedstock with injection of the hydrogen (Fig. 5).

Operating Costs

Table 1 summarizes the operating characteristics and operating costs for the processes above (A, B, C, D, E, F, and G). The plant capacities shown are the hourly make rates in 1000 Btu per cu ft equivalents. Each plant with cyclic generation would be equipped with a relief holder and a 1000 Mcf storage holder. Such cyclic plant would be expected to operate 22 hours per day at 450 Mcf per hour. Those plants with continuous generation and without a storage holder are designed to handle a 6 percent peak sendout or 600 Mcf per hour.

Table 2

Labor Costs

Operating labor (2 shifts) other than supervisors who may be in the plant and included in fixed charges

Duty	A	B	C	D	E	F	G
Shift foreman	2	2	2	2	2	—	2
Gas makers	4	4	4	2	2	2	2
Gas makers' helpers	2	2	2	2			
Boiler fireman	2	2	2	2	2		2
Engineers	2	2	2	2	2	2	2
Compressor, etc.							
Yard men	2	2					
	14	14	12	10	8	4	8
Labor cost at $2.67/hr and average production of 250 Mcfh	$.075	$.075	$.064	$.054 Per Mcf	$.043	$.021	$.043

Steam costs — materials — boiler efficiency 70% — 1100 Btu per pound of steam.

Gallons of oil — $\frac{1000 \times 1100}{.70 \times 100{,}000} = 15.7$ therms

Bunker C — 150,000 Btu/gal. $= \frac{10}{15} \times 15.7 = 10$ gallons @ 7.2¢ = 72¢ Use $.70 @ 72% efficiency

No. 2 Fuel Oil — 138,000 Btu/gal. $= \frac{100}{138} \times 15.7 = 11.4$ gals. @ 10¢ = 1.14¢ Use $1.00 @ 80% efficiency

Thus, it can be noted that we are not depending on total or average daily capacity but instead are providing for hourly peaks.

Table 1 is based on periods of actual operation with provision for miscellaneous supplies and maintenance. Training periods, test runs, or start-up time are not included. The ideal peak load plant can be locked up and put to bed when not needed but only where a sound training program exists, and someone is responsible for periodic inspection. For this study, to be ultraconservative, perhaps, provision is made (in later Fixed Charges) for watchmen all year around-the-clock.

The gas analyses at the foot of Table 1 are typical of the type of gas but do not necessarily conform to the sendout heating value selected.

Table 2 shows a breakdown of the estimated labor cost and some figures on calculated steam cost. It should be noted that supervision is to be accounted for later as part of fixed charges.

Plant Costs

Since delivery pressure is to be 100 psig, care has been taken to include compressors in plant cost and to provide for compressor operators as necessary. In some cases, it is gas compression from storage holder; for CAR operation a booster is contemplated; the LPG-air system requires an air compressor.

Plant costs can be compared by reference to the summary in Table 3. All essential costs are included with the exception of land (already owned in this instance, and otherwise a variable). Note that relief holder and/or storage holder are provided when necessary.

The catalytic-premium feedstock processes make directly to storage. The catalytic autothermic process (CAR) can operate with low, intermediate, or high-pressure storage. LPG-air conventionally functions without a holder; one can be utilized if extant, but new holder construction could not be justified. Pressure hydro-gasification, the process developed by IGT, can theoretically be run without a holder but one might be used if available. New construction of an intermediate or high-pressure holder might be warranted but has not been included in these costs.

Provision in Table 3 has been made for piling, RR siding, electric service, grading, fencing, and buildings. A compressor station is included, as required.

Auxiliaries Included

Included with the gas generating equipment are all such auxiliary and accessory items as blowers, piping, hydraulic system, controls, coolers, purifiers (when needed), and feedstock and by-product storage (when needed). A steam boiler plant is also included.

For the catalytic autothermic reformer (CAR — Process E) the costs include the refractory lined generators, process feed distributors, catalyst charges, blowers and pumps, air saturator, heat exchangers, electric start-up unit, and instrumentation for full, safe automatic control.

The LPG-air system includes air compressors, vaporizers, high-pressure propane storage for 10 days' operation, and fully automatic controls with proportioning and Btu adjustment. Incidentally, refrigerated propane storage at either low or intermediate temperature would be worthy of special consideration.

For pressure hydro-gasification, Process G, plant costs cover the furnace generators with alloy tubes and catalyst for cracking to H_2, alloy tubes for pressure gasification, and preheat tubes. Also included are the water gas shift chambers, CO_2 removal, and heat exchangers.

Table 3

Comparative Cost of 10,000 Mcf Per Day Plant for Gas from Liquid Fuels in $1,000

Process Feedstock Plant Cap. 1000 Btu Equip.	A. Hi-Btu Oil Gas 12% C Oils 450 Mcfh		B. Hi-Btu Oil Gas Gas Oil 450 Mcfh		C. Oil Gas w. Catalyst Naphthas 450 Mcfh	
Oil Gas Sets (no extra cost)	(2) 12′–6″	*$ 800	(2) 11′–0″	*$ 650	(2) 11′–0″	*$ 700
Coolers, Tar Extractors, Purifiers, etc.		650		600	Cooler and decanter	100
Cooling Water (gpm)	4,000		3,500		3,000	
Steam Gen. (Lbs/hr) & FW	65,000		60,000		40,000	
Equip. and Piping		650		600		400
Yard Piping and Pumps		400		350		135
Tar Handling & Storage Gals.	300,000	290	150,000	210	—	—
Relief Holder (cu ft)	00,000	250	200,000	250		
Electric Service		100		100		60
Storage Holder (cu ft)†	1,000,000	640	1,000,000	640	1,000,000	640
Oil Storage (Gal.)	1,000,000	80	1,000,000	80	1,000,000	80
Grading, fencing, etc (Acres)	14	70	10	50	5	25
Building	7	475	7	450	6	400
RR Siding	1	20	1	20	1	20
Light Oil Stripping Plant		245		245	—	—
Compressor Plant, (hp)	2,000	600	2,000	600	2,000	600
Piling—50′ Lengths		120		90		50
Total Approximate Cost		*$5,390		*$4,935		*$3,210
Approximate Time to Build—Months		18		18		16
Number of men to operate		14		14		12
		Fixed Charges — 10,000 Mcf Per Day Plant				
Investment/Mcfd		$539.00		$493.50		$321.00
14% Investment Charge		75.46		69.09		44.94
Supervision, clerical, watchmen, mechanics, overhead		4.35		4.35		3.80
Working Capital		.75		.75		.65
Total Annual Charge per Mcfd of Capacity		$ 80.56		$ 74.19		$ 49.39

* In Thousands of Dollars.
† Includes Piling.

The cooling water specified is the approximate quantity required for gas cooling, for compressor jackets, intercoolers, aftercoolers, and miscellaneous applications. It is contemplated that city water be purchased, in view of the limited annual requirement. Greater utilization of the peaking gas plant might justify water wells or cooling towers.

The steam generating plant is based on the approximate maximum pounds per hour steam required for process, heating, and some power. The steam plant includes automatic oil fired boilers, fuel supply, stack and draft control, feedwater supply and treatment, all piping for high and low-pressure steam and condensate, and a building.

Yard piping includes gas mains, oil, LPG, water, liquor, and tar piping, as needed, with pumps.

Tar handling, when tar is a by-product, comprises tar and liquor separators, storage tanks for tar emulsion and dry tar, tar dehydrating equipment, and pumps.

Storage Facilities

The relief holders chosen for Process A or B are of two-lift water seal construction (200 Mcf). Storage holders for A, B, C, and D are four-lift water seal type (1000 Mcf). Piston or diaphragm holders could well be considered as alternates.

Storage for Process E is to be a 60 psig sphere, equivalent to 1000 Mcf at standard conditions. No gas storage is provided for F and G as these systems can produce at the sendout pressure.

Plant Site

The acreage indicated is the size of plot suggested for each type of plant. Estimate for grading assumes that the site is approximately level, free of heavy vegetation or structures, and grading will include drainage, roads, and final surfacing with broken slag or similar materials. Provision for fencing covers an eight-foot high chain link fence topped with three strand barbed wire, on all four sides of an approximately square plant area.

Buildings

The number and approximate total cost of buildings are indicated in Table 3. It is contemplated that each of the seven different type plants would require at least a boiler house, service building-storeroom, and office. Most of the processes would require a generator building, apparatus room, pump stations, and compressor house.

The railroad siding covers tracks at grade on the plant property. with grounding and insulated joints where propane is to be handled.

Piling for holders and heavy apparatus is to consist of reinforced concrete in casing, capable of withstanding a load of 30-ton per pile at a depth of 50 ft.

Cost Range

It is interesting to note that a 10,000 Mcf per day plant can be built complete for a cost ranging from $1,660,000 to $5,390,000. Construction time varies from 10 to 18 months.

The lowest first cost, logically, is to be found in an LPG-air system or simple reforming. The highest first cost rests in a Hi-Btu oil-gas plant for heavy oil with light oil recovery. By way of brief historical reference, it might be said that the highest cost plant in the table would be considerably less, per therm output, than either a coal-gas or water-gas works.

The fixed charges are determined in each case from the investment, taking capital cost at 14 percent for interest, depreciation, insurance and taxes, adding for supervision, clerical, mechanical, overhead, and working capital.

Table 3

Comparative Cost of 10,000 Mcf Per Day Plant for Gas from Liquid Fuels in $1,000

Process	D. Cyclic Reformed and Enriched		E. CAR Enriched		F. LP-Air		G. Pressure Hydrogasification	
Feedstock Plant Cap. 1000 Btu Equip.	Naphtha and Propane 450 Mcfh		Propane 450 Mcfh		Propane 600 Mcfh		Naphtha 600 Mcfh	
Generators	(1) 12′–6″	*$ 450	(2) 9′–0″	*$ 100	LP-Diluter	*$ 30		*$2,450
Coolers and Decanter		75		75				56
Cooling Water (gpm)	1,500		1,500		500			
Steam Gen. (Lbs/hr) & FW Equip. & Piping	35,000	210	10,000	60	7,500	45	15,000	150
Yard Piping and Pumps		100		100		40		40
Electric Service		50		50		25		50
Storage Holder (cu ft)†	1,000,000	640	(1,000,000 equiv. hp)	500				
Oil Storage (Gals.)	250,000	20					1,000,000	80
30,000-gal. LPG Tanks	32	640	44	880	44	880		
Vaporizers (gph)	4,150	20	6,700	30	6,600	30		
Grading, Fencing, etc.—Acres	5	25	5	25	3½	20	4	20
Buildings, no extra cost	6	375	5	250	5	200	5	300
RR Siding	1	20	1	20	1	20	1	20
Compressor Plant, (hp)	2,000	600	2,000	600	1,000	300		
Piling—50′ Lengths		75		75		70		60
Total Approximate Cost		$3,300		$2,765		$1,660		$3,226
Approximate Time to Build—Months		12		12		10		12
Number of men to operate		10		8		4		8
	Fixed Charges — 10,000 Mcf Per Day Plant							
Investment/Mcfd		$330.00		$276.50		$166.00		$322.60
14% Investment Charge		46.20		38.71		23.24		45.16
Supervision, etc.		3.80		3.24		2.24		3.24
Working Capital		.60		.60		.60		.60
Total Annual Chg. per Mcfd of Capacity		$ 50.60		$ 42.55		$ 26.08		$ 49.00

* In Thousands of Dollars.
† Includes Piling.

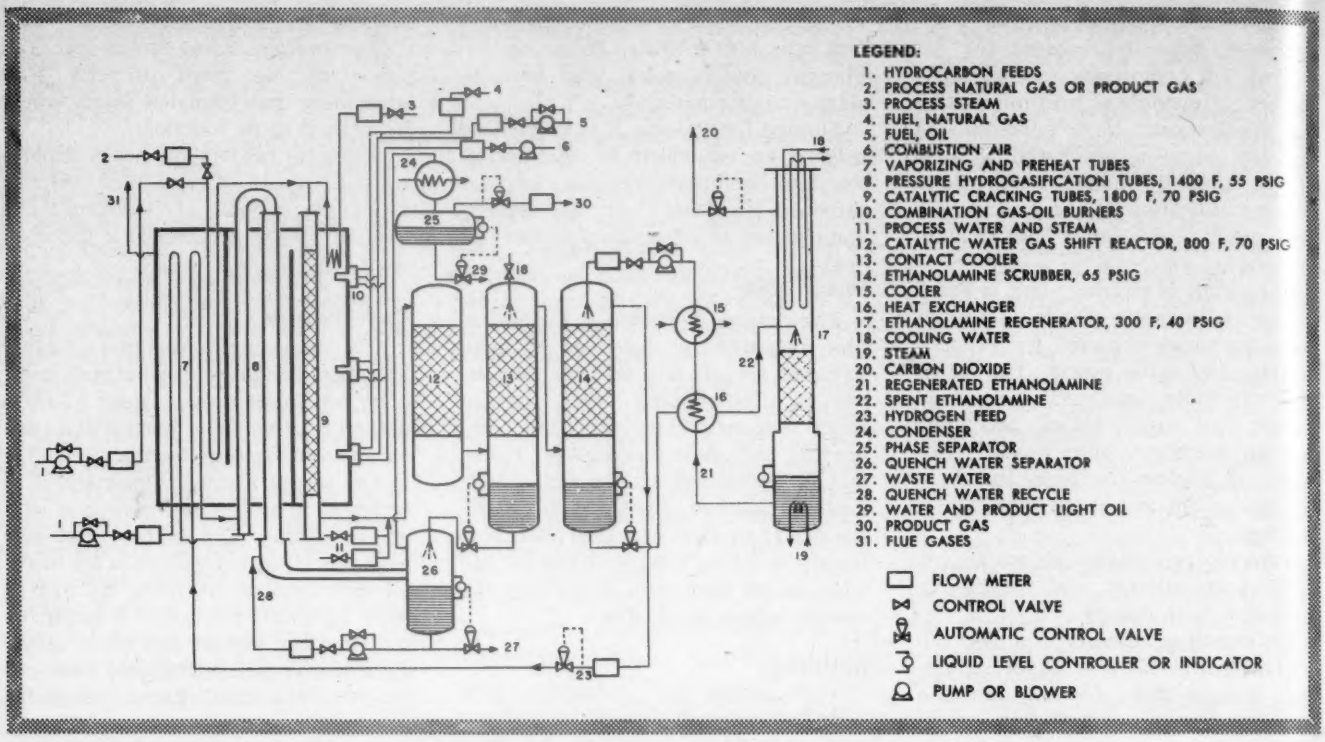


FIG. 5. Diagram of pressure hydrogasification pilot plant.

These fixed charges represent quite a conservative approach since provision has been made for a superintendent, clerk, watchmen and mechanics — all on a full-time basis.

Making the Choice

Now, with engineering and economic data tabulated for seven processes, how to make a choice? Which is the least expensive to install and the easiest to operate? Propane-air. Which has the highest net operating cost per 1,000,000 Btu? Propane-air, because of feedstock cost and loss of revenue. If you would like to consider propane-air, one table says "BUY"; the other says "DON'T".

If we may assume an annual peak gas production of 100,000 Mcf in this case, an interesting comparison can be seen in Table 4. For this annual make, the fixed charges govern economic considerations and Processes A and B appear to be just a bit expensive. The LPG-air system (F) is the least expensive, but C, D, E, and G are worthy of close consideration.

If the annual production of peaking gas is to be 500,000 Mcf (50 full days operation), Table 4 shows the comparative shift and, strangely enough, the seven processes almost approach economic equality at this annual production rate.

Interchangeability of Gases

In this article, all of the processes studied were selected as being natural gas substitutes. For this reason higher heating values were set for the sendout gas in some cases and a charge made for the giveaway or loss of revenue. In spite of this carefulness, it can not be said truthfully that all of these gases have exactly the same interchangeability. In fairness, perhaps, some extra credit should be given to Process G with a 1000 Btu gas at about 0.60 specific gravity. Somewhat lesser credit can be given B, C, D, and E (higher heat value).

Admittedly, costs are an important factor but for peak shaving, other and perhaps intangible factors exist. One is to plan for the future. A peak load plant utilized 10 days in 1958-59 may be needed 60 days in 1960-61 and may have to be expanded. Expansion costs are different and not necessarily proportionate to first cost. Convenience, dependability, cleanliness, public necessity are all important factors in choosing a peak gas process.

The authors have gone just about as far as they can with you; the choice is now yours.

Acknowledgment

This article adapted from a presentation made at the AGA Operating Section Conference, New York City, May 1958. * * *

Table 4
Annual Costs, $/Mcf

	A	B	C	D	E	F	G
For Production of 100,000 Mcf							
Operating Cost	0.985	1.470	1.795	1.528	1.520	1.855	1.375
Fixed Charges	8.056	7.419	4.939	5.060	4.451	2.608	4.944
Total	9.041	8.889	6.734	6.588	5.971	4.463	6.319
For Production of 500,000 Mcf							
Operating Cost	0.985	1.470	1.795	1.528	1.520	1.855	1.375
Fixed Charges	1.611	1.484	0.988	1.012	0.890	0.522	0.989
Total	2.596	2.954	2.783	2.540	2.410	2.377	2.364

Here's a tested formula for . . .

Estimating Gas Engine Service Revenues

Donald C. Neill,
Rate Analyst
Southern Counties Gas Company
Los Angeles, California

THE NEED FOR MAKING REVENUE ESTIMATES IS OBVIOUS. Budgets, rate changes, and financing plans require management to estimate income. Depending upon individual company requirements the basic budget is generally prepared at least once a year with a possible variance from one or two revisions during the year to a regular monthly review. Changes in rates, unexpected expenses, meter growth estimates, and capital additions all affect the budget.

In the June 1958 issue of *American Gas Journal* a formula method for estimating revenues from general service customers was presented. Since the full scope of making revenue estimates embodies classes of service in addition to general service, the following discussion has been prepared as the second in a series. Specifically, this article relates to gas engine revenue estimates.

Gas Engine Service Revenues

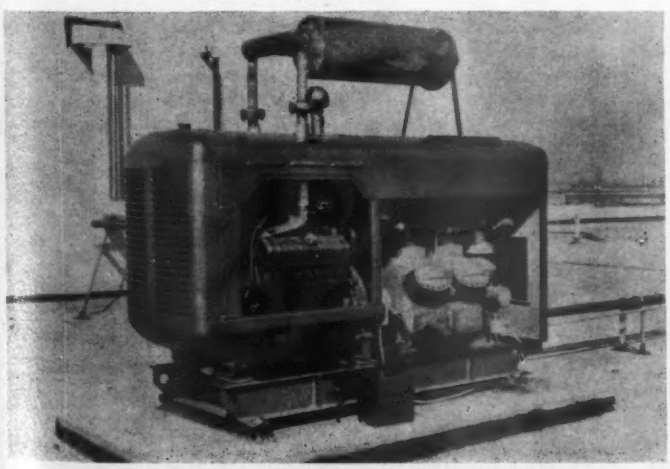
Gas engine customers may contribute a very small percentage of total revenue, but this percentage could easily vary depending upon the economics of the locality served by the utility. These customers use internal combustion engines for many purposes; typical uses include use as prime movers for compressors, water pumps, electric generation, air conditioning equipment, oil well drilling, and as a prime mover for industrial machinery.

Generally speaking, each customer will use gas engines for a single purpose. Therefore, on a company-wide basis there may or may not be a typical monthly load pattern for gas engine sales. For instance, in the more arid parts of the country, gas engines are used primarily for pumping water seasonally for agricultural irrigation. In addition, local water companies may pump water on a year-round basis. Under these conditions, this load pattern will produce peak sales during the dry months or when irrigation is active.

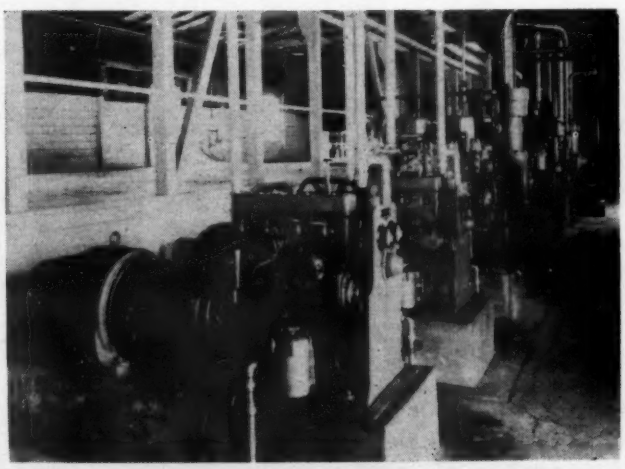
The graph in Chart 1 shows a typical percentage distribution of gas engine sales by months, based upon a five year-average, as experienced by a utility serving in the southwest portion of the country where water pumping represents the dominant usage.

Gas engine customers generally prefer firm rather than interruptible service. This factor is reflected in the design of the rate schedule and the preferred service rendered should, accordingly, produce a higher average unit of revenue than interruptible service, similar to the firm industrial class.

A rate schedule for gas engine service can be designed very readily to reflect variations in seasonal usage and annual consumption and, at the same time, produce a predetermined level of revenue. For instance, a seasonal rate may be desirable to encourage system off-peak usage by large customers. A larger minimum charge during this off-peak period will quickly accomplish this when combined with a lower commodity charge. Other schedule variations include an annual minimum charge with a cumulative feature, aggregative billings, and possibly an additional meter charge for each meter in excess of one where such consumption is aggregated for billing purposes. Table 1 is a typical gas engine service rate schedule embodying these various features.



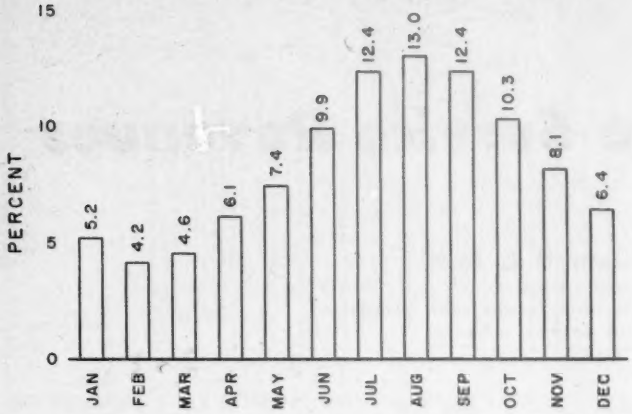
Gas engine driving a refrigerant compressor. Unit is used for air conditioning the Sears Roebuck warehouse in Los Angeles. It's a 100 ton unit located on the roof of the building. Control is completely automatic and will stop and start automatically with the engine speed varying according to the load conditions.

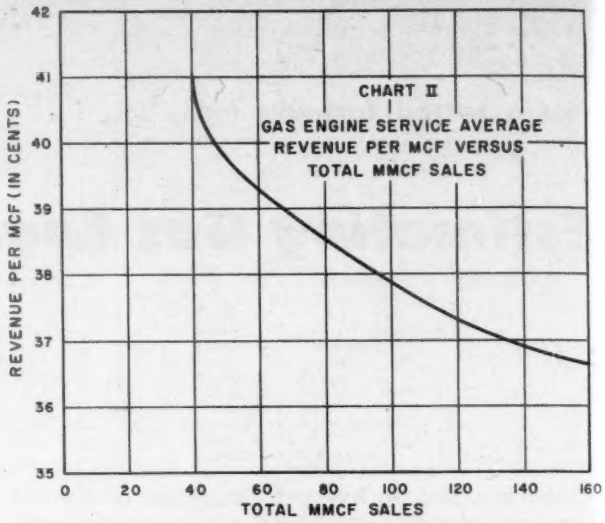


Typical ice plant operation. The first two engines generate electricity for the plant. The third engine in the background drives a refrigeration compressor (ammonia). The generators are rated at 25 kw each.

CHART I

MONTHLY PERCENTAGES OF ANNUAL GAS ENGINE SALES IN THE SOUTWEST U.S.





Analyze Usage Trends

The conventional approach for estimating gas engine revenues is first to analyze the historical statistics for several years past on a monthly basis. This should cover:

1. Number of customers (or meters, whichever is appropriate).
2. Monthly and 12-month moving total of Mcf sales.
3. The relationship of the average revenue per Mcf to total Mcf sales, by months.

An example of the basic data for developing trends and estimates is shown in Table 2 for a two-year period. (Generally a period of four or five years is used.)

After studying the trends, which are plotted on charts, an estimate of the number of customers by months for the future period is made. Once this is done the related annual sales are estimated, based upon the trend.

A check on the reasonableness of the level of estimated sales is made by extrapolating the trend in annual average usage per customer on a 12-month moving basis through the end of the estimated period. The total estimated sales volume

Typical gas engine installation used for irrigation. The engine is pumping 2500 gpm. The power output of the engine is 225 hp.

TABLE 1.

Typical Rate Schedule for Gas Engine Service.

	Per Meter Per Month Base Rates, 1100 Btu
Rate "X"	
First 100 Mcf, per Mcf	47.1¢
Next 400 Mcf, per Mcf	42.1¢
Next 500 Mcf, per Mcf	38.1¢
Over 1000 Mcf, per Mcf	36.1¢
Minimum Charge:	
Per Meter Per Month	$6.
To be made cumulative only when total billing exceeds $72 per meter at any time during the contract year.	
Optional Rate "Z"	
(Effective April 1 to Nov. 30, Inclusive)	
First 100 Mcf, per Mcf	46.1¢
Next 400 Mcf, per Mcf	41.1¢
Next 500 Mcf, per Mcf	36.1¢
Over 1000 Mcf, per Mcf	32.1¢
Minimum Charge:	
Per Customer Per Month	$100.
To be made cumulative only when total billing exceeds $1200 per customer at any time during the contract year.	

Special Conditions

1. All gas consumed during the entire year, at all meter locations, by any customer served under optional **Rate "Z"** may be aggregated. In addition to the rates quoted above, an annual meter charge of $25 will be made for each meter installation in excess of one. Meter readings will not be aggregated for associations or combinations of customers, where, in the judgment of the Company, the operation of one or more plants has been transferred from one customer to another customer for this purpose.

2. Service will be supplied to gas engine driven drilling equipment of a temporary nature only under **Rate "X."**

3. Customers served under this schedule shall have priority in the use of gas over customers served under Interruptible Industrial schedules, at times when there is insufficient gas to supply the demands of all customers.

4. A contract covering the fuel requirements of the customer for a period of at least one (1) year will be required as a condition precedent to service under this schedule and shall continue in force and effect thereafter until either the Company or the customer shall give the other party thirty (30) days' written notice of a desire to terminate same, whereupon at the expiration of said thirty (30) days it shall cease and determine; provided, however, if the customer permanently ceases operations at any time such contract shall not thereafter continue in force.

TABLE 2.
Monthly Summary of Gas Engine Customers, Sales and Revenue.

Month	Number of Customers	Mcf Sales	Revenue	Average Revenue Per Mcf
January	294	53,756	$21,285	39.60¢
February	306	41,895	17,178	41.00
March	305	43,429	17,596	40.52
April	304	71,669	28,381	39.60
May	303	70,755	27,779	39.26
June	305	110,197	41,707	37.85
July	303	130,696	47,870	36.63
August	307	133,841	49,609	37.07
September	307	127,259	46,872	36.83
October	304	111,389	41,396	37.16
November	306	101,656	38,273	37.65
December	304	101,249	38,292	37.82
January	306	83,903	$32,134	38.30¢
February	304	48,470	19,240	39.69
March	306	50,195	19,877	39.60
April	304	60,908	24,984	41.02
May	304	82,892	32,070	38.69
June	303	115,992	43,628	37.61
July	306	154,093	56,573	36.71
August	311	156,913	57,537	36.67
September	308	147,285	53,915	36.61
October	309	132,865	49,160	37.25
November	310	100,150	37,857	37.80
December	310	95,250	36,290	38.10

must necessarily be spread by months to reflect the seasonal pattern of sales. This can be done based upon actual experience. To the extent necessary other factors such as the future effect of a sales promotion campaign, competition in the service area, etc., may be reflected.

Once the monthly estimates are completed, the pricing problem commences. The relationship mentioned in item No. 3 above is used to develop an average rate curve (revenue per Mcf). Such a curve is shown in Chart 2, based upon the data in Table 2. The curve may be calculated or, as in Chart 2, drawn free-hand through the plotted points. Points falling far off the line may be ignored or taken into consideration depending upon the particular circumstances that have caused the variations. An analysis of the basic data should indicate the reason for any odd point.

Estimating Revenues

The process of estimating the revenue is simply a matter of reading the average rate off the plotted curve for the amount of each estimated monthly sales volume and multiplying the volume by the average rate.

For example, if estimated sales for January are 80,000 Mcf, the average expected rate (refer to Chart 2) would be 38.5 cents per Mcf; 38.5 cents times 80,000 Mcf yields $30,800 estimated revenue.

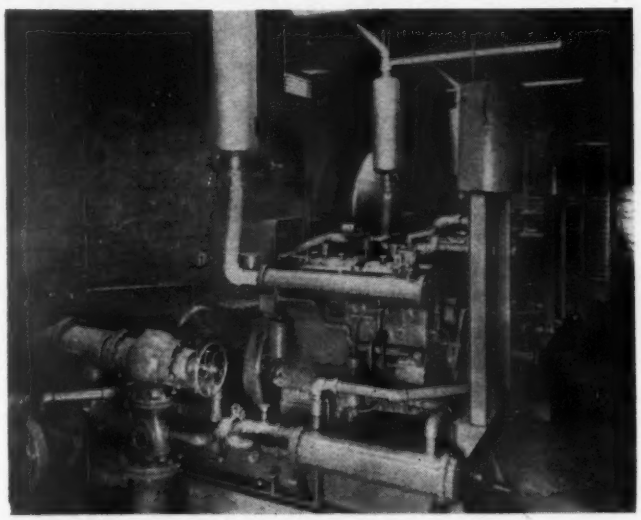
As previously mentioned, there are at times average rate points on the chart that are quite far off the curve. Reference to Chart 2 shows several such points falling above the normal pattern. Analysis of the basic data indicates that in this case they are for the months of April and May. Further analysis reveals that during these months the contract year begins for many customers and the reconciliation billing of the annual minimum charge for the prior year has the effect of inflating the revenue for that month. Such a fact should therefore be reflected in estimating revenues for these two months.

The actual average rate should be plotted each month in order to maintain a check on the average curve used for estimating. Wide variations should be reviewed since the possibility of a billing error always exists.

One of the distinct advantages of this relatively simple estimating procedure is that the average rate curve is based upon actual total company experience for the gas engine class. Therefore, the average rate curve automatically reflects seasonal variations in average usage, as well as the composite average usage for all customers, and different Btu rate levels in effect.

Estimates for Rate Cases

Revenue estimates for rate cases can be made on a similar basis. With a proposed increase of, say, 4 cents per Mcf in the commodity charge on the schedule, the whole rate curve is moved up automatically by 4 cents. Actually, of course, the revenue estimate would be accomplished by applying the 4 cents to the total sales volume without physically re-drawing the curve. A proposed change in the minimum charge can be reflected by multiplying the difference in the present and proposed minimum charge by the total number of customer-months in the estimated period.



Typical water pumping booster plant. A water utility uses this to boost water pressure for its distribution mains. Engines are equipped with variable speed control. Speed is controlled by the water pressure in the system. As the pressure goes up, speed decreases and vice versa. Engines are rated at 100 hp each. The water pumps they drive maintain a 65 lb pressure on the water system.

Since normalized revenues are used as a basis for ratemaking there have been attempts, from time to time, to adjust a growth trend for the effect of rainfall, in service areas where gas engines are used primarily to pump water for irrigation purposes.

A word of warning is advisable. **Correlation work in this connection must be carefully analyzed before blindly accepting the fact that a correlation does exist.**

Even in areas where a good statistical relationship is calculated, the basic facts as type of customer, his usage, etc., must be objectively reviewed prior to accepting the result. Cases have occurred where such correlation was merely coincidental. In general, unless the revenues from this class of service are sufficiently large as a percentage of total revenue a refinement to adjust for rainfall is not justified. *

Correction

In Part 1 of this series on estimating revenues, the article on *Estimating General Service Revenues,* page 33, June 1958 issue, the last line of Table 1 (Example of Calculation of Revenue Formula) should read:

$a = 8.50150 - (11.04683 \times .655113)$
[instead of (11.04683 ÷ .655113)]
$= 8.50150 - 7.236922$
$= \$1.264578$

Please correct your copy of this issue to read accordingly.

Colorful landmark at Frontier City, USA, is this flaming covered wagon. Special system of gas burners keeps flame going night and day on the asbestos-covered wagon.

Southwest's most unique tourist attraction

Frontier City Goes Gas

John W. Dexter

A FLAMING PRAIRIE SCHOONER that blazes brilliantly in the night sky is attracting thousands of tourists from every corner of the Union to Frontier City, USA, the most unique tourist attraction in the Southwest.

In this re-creation of a lusty pioneer town, complete with colorful buildings and traditional board walks, natural gas plays a vital part in creating an atmosphere akin to that of frontier times.

The burning covered wagon is one of the chief landmarks of Frontier City, which sprawls over much of a half-mile strip fronting along U.S. 66-77, a mile west of the Turner Turnpike entrance northeast of Oklahoma City.

It is, however, only one of many uses being made of natural gas to help attract tourists. Inside the bustling village, gas is used in a gas street light at one of Frontier City's busy intersections and in a smaller post-mounted gas light installed on the fence paralleling the highway.

The flaming wagon was the idea of James C. Burge, managing director of Frontier City, who dumped the problem of getting it into operation into the lap of Jerry Hager, utilization foreman for Oklahoma Natural Gas Company.

Hager solved the problem neatly and effectively by designing a burner with a number of separate gas jets that would stay lit in all kinds of weather.

So successful was the burner design that it gives a continuous impression that the asbestos-covered wagon top is actually on fire.

The burner was fabricated from

TOURIST ATTRACTING: *New Use for Gas?*

Two youthful observers found the burning wagon so interesting they climbed inside for a better look at the circular pipe burner system.

Frontier City's main street, one of six avenues in the colorful village, is popular with special group outings as well as tourists. Here, Marshal Chuck Clay welcomes Oklahoma City's India Temple Shrine Mounted Patrol, which rode out to the park in a group.

¼-in. pipe, placed just inside the wagon top, with a dozen jets extending through the top, each welded to the pipe ring. The circular design provides an even flow of gas to all burners. The jets are of uneven length to make the flame pattern more realistic. Individual cups around each jet keep the flames from being blown out by the gusty Oklahoma winds. The wagon-top burner consumes approximately 3000 cu ft of gas daily, burning continuously throughout each 24-hour period.

At the town's busiest intersection is an old Philadelphia gas street light, similar to the ones used at Independence Square in Philadelphia. It was purchased from the Welsbach Gas Light Company of that city. Frontier City's directors and concessionaires are so impressed with the manner in which the gas lights blend into the pioneer atmosphere that 20 additional lights are scheduled for installation in the autumn.

Future plans also call for installation of smaller post type gas lights along the half mile of rail fence that parallels U.S. 66-77.

Gas is also being used as fuel for the engine that powers the pump on an oldtime oil well on the grounds. The 40-ft high wooden rig, complete with heavy timber walking beam, is the same rig that was seen last year in Boom Town, one of the main attractions at the Oklahoma Semi-Centennial Exposition.

Gas is supplied to Frontier City through some 2000 ft of 2 and 4-in. line installed by Oklahoma Natural from a transmission line adjacent to the tourist attraction site.

This popular tourist center is also unique in amusement park annals because each of the 40-odd concessions is owned outright and operated by a Frontier City tenant, several of whom live in quarters at the rear of their concession buildings. Consequently, natural gas is used for the same purposes — cooking, heating, and water heating — as it is in any other progressive community. Next year, Oklahoma Natural officials indicate, the uses of gas will be extended to air conditioning, incineration, clothes drying, and refrigeration at Frontier City — to provide all of the regular seven superior uses of gas plus two new ones — lighting and tourist-attracting.

Visited daily by thousands of tourists, Frontier City's Old West atmosphere is highlighted by such events as gunfights in the streets in the Gun Fight Corral, stage coach rides through rugged back country reminiscent of early day badlands, a scenic ride on a train pulled by an oldtime, balloon-stacked steam locomotive, and a wax figure museum filled with life-like portrayals of gun-slingers of an early era. Also on the schedule are week-end rodeos and tent show melodramas. All this plus free admission and free parking.

* * *

Another youthful visitor takes a closer look at an old Philadelphia gas street light, now located on a busy intersection in Frontier City. The gas light has proved so popular that 20 more will be installed.

Open Absorption Systems

THERE ARE MANY variations of the absorption refrigeration system and all of them have one thing in common — the property of certain materials to attract other materials and cause them to go into solution.

The open systems, however, differ from the closed systems (such as that in the Arkla-Servel units) in that the absorbent acts directly on the air being conditioned. In the closed system, the absorption is actually a part of a thermodynamic process that results in a refrigeration effect.

Fundamentals of the open system are relatively simple, consisting mainly of liquid vapor contacts, pumps, heat exchangers, and controls. Elements of the system are shown in the accompanying diagram.

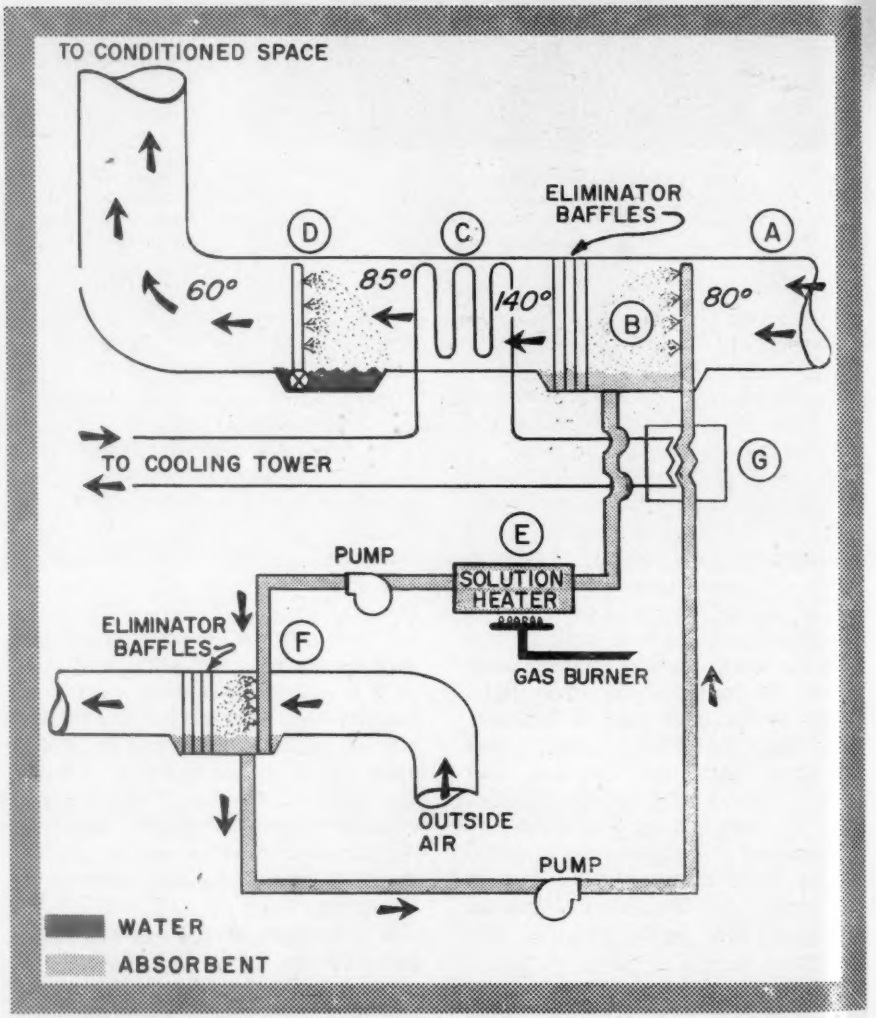
Beginning with Point **A** on the diagram, air enters the unit from the conditioned space at about 80 F. This air passes through a spray of the liquid absorbent — calcium chloride, lithium chloride, or glycol solutions — that dries or dehumidifies the air (Point **B**).

This dried air is then warmed by the latent heat of condensation of the absorbed water to about 140 F and passes through the **eliminator baffles,** which prevent carryover into the air stream of any entrained absorbent.

The warm dry air then passes over a cooling coil at Point **C** and is reduced in temperature to 85 F. Water for the cooling coil is held at a relatively low temperature by means of a cooling tower.

The air then passes through a water spray or resaturator, Point **D,** where the latent heat of vaporization of the water provides additional cooling to 60 F. The air is then ready for distribution to the conditioned space.

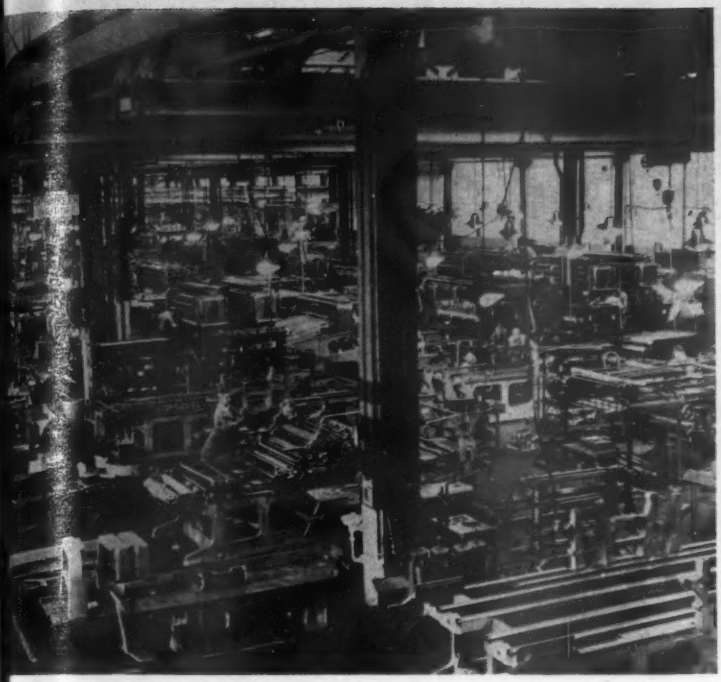
At Point **B,** the liquid absorbent, after absorbing the water vapor from the air, falls into the overflow pan, flows through the piping as indicated, and into the solution heater at Point **E,** where heat is applied by means of a gas burner to warm the solution.



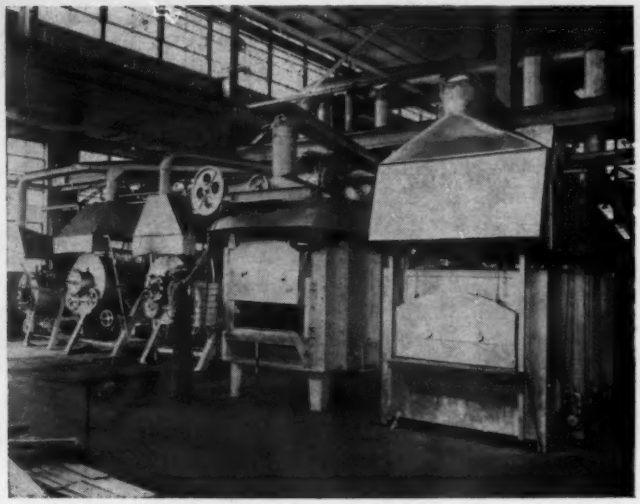
At Point **F,** the absorbent is sprayed into a stream of outside air, and due to its elevated temperature, easily gives up the absorbed water to the air.

Here again, eliminator baffles are used to reduce the carryover of the entrained absorbent in the air that is discharged to the outside. The concentrated absorbent is then pumped through the piping, into heat exchanger **G,** and then back to Point **B** where it is again sprayed into the air entering from the conditioned space.

This system is similar to that employed in the *Kathabar* system, which is used for dehumidification.



Overhead view of one of production areas at the Miehle Printing Press and Manufacturing Company plant.



Battery of five gas-fired carburizing furnaces, consisting of three rotary type and two oven type, are used for the heat treatment of gears, rollers, and shafts.

CASE HISTORY:

Gas Helps Build Miehle Printing Presses

Chicago company, leader in its field, ships presses to all parts of globe

CHICAGO IS THE COMMERCIAL printing capital of the world. Annually, this industry in Chicago alone does a business of more than $1-billion; hires more than 100,000 people; carries a payroll of more than $500,000,000. So stated John S. Knight, editor and publisher of the Chicago Daily News, in a guest editorial that appeared in a recent issue of *Printing Views* magazine.

As an integral part of the above picture, the Miehle Printing Press & Manufacturing Company, a pioneer and one of the leaders in the manufacture of printing equipment since 1890, is a well-known name in the graphic arts world. Founded in that city, the Miehle Company has grown with Chicago and has expanded with the printing industry. Today, Miehle presses are shipped to all parts of the globe.

The types of presses now produced by the company are principally sheet-fed letterpresses and offset presses, which print on sheets of paper, as distinguished from web-fed newspaper and large magazine presses, that print on rolls of paper.

It is estimated that there are approximately 35,000 commercial printing establishments in the United States alone. Miehle presses are found in most of the large commercial printing establishments in this country, in the Government Printing Office and the Bureau of Engraving and Printing and in thousands of smaller shops.

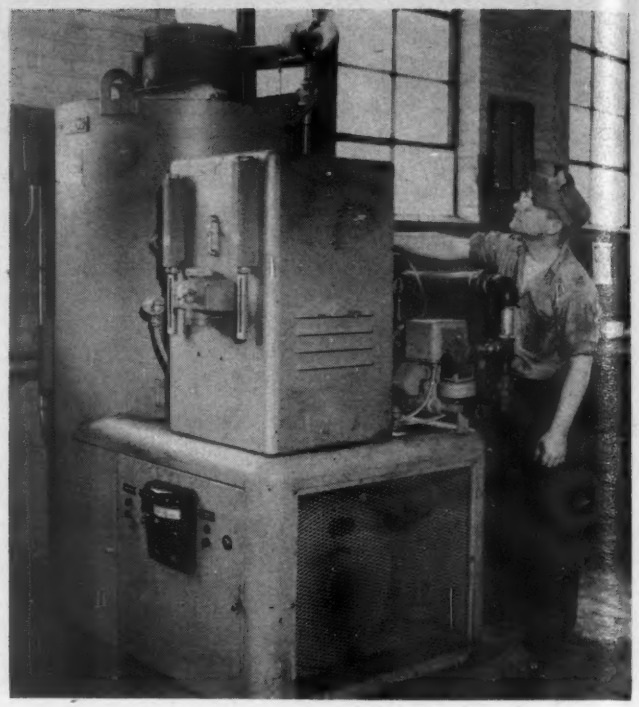
Letterpresses print by the typographic method, in which the printing surface is raised in relief. Most printing is done by this method. The first Miehle vertical letterpress was introduced in 1922 to meet a critical need in the trade for a small fast job press and has gained world-wide acceptance as the basic job press for pressrooms of all sizes. Other letterpresses of Miehle manufacture are flatbed presses, rotary presses, and both flatbed and rotary perfector presses printing on both sides of the sheet in one operation.

It is a tradition in the trade that a Miehle press is always dependable. The company has never departed from its first policy; whatever Miehle makes must be constructed with the finest materials and the finest workmanship possible.

Helping to maintain the company's tradition for fine craftsmanship has been the use of gas fuel for industrial purposes. Miehle has been using gas for various forms of heat treating since the turn of the century. For maintaining precise temperature control required in the many uses of heat in the manufacturing processes at this plant, gas has proved to be not only versatile and dependable, but economical as well.

One of the big uses for gas at the Miehle plant is for carburizing gears, rollers and shafts. For this operation there is a battery of three American Gas Furnace rotary type furnaces, one Stewart oven type furnace, and one Barkling oven type furnace. The average heating cycle for this work is from

Car loaded with cast iron castings such as cylinders, girths, main frames, gears, cams, and supports, is shown entering gas-fired stress relieving furnace.



Gas-fired hydryzing generator is used to generate a selective atmosphere which will be utilized for carburizing purposes.

five to six hours, depending upon the depth of case required.

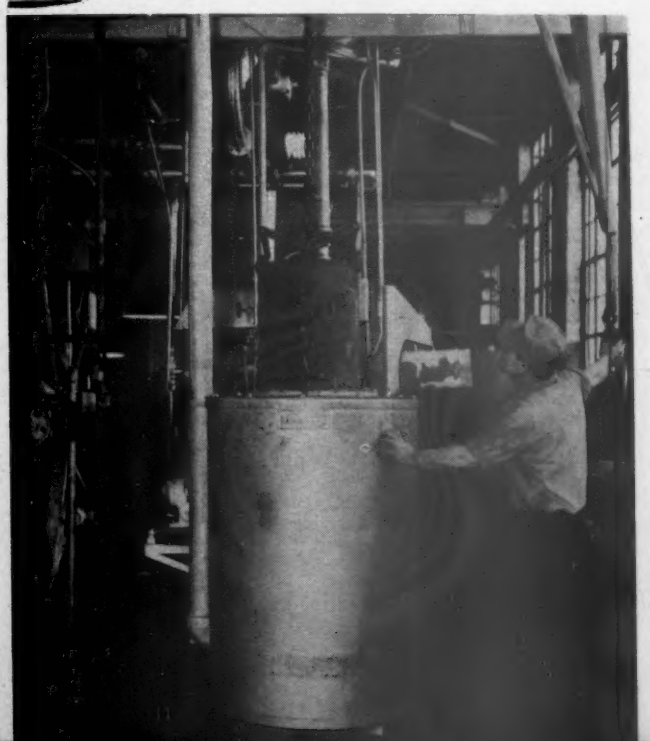
A Despatch Oven Company gas-fired stress relieving furnace, 6-ft wide, 12-ft long and 8 ft high, is being used to remove the stresses and strains of various size cast iron castings consisting of cylinders, girths, main frames, gears, cams and supports.

A gas-fired Lindberg hydryzing generator, with Wheelco controls and Maxon safety shut-off valve, was recently installed to generate a selective atmosphere used in carburizing.

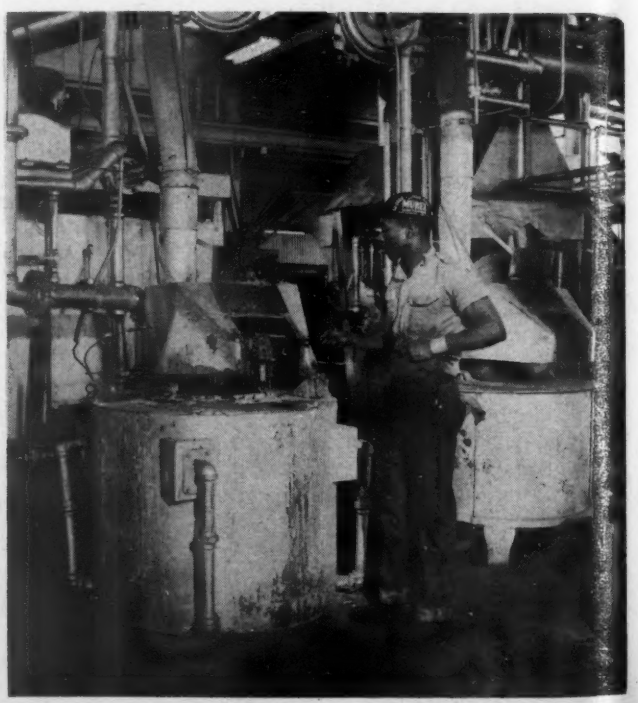
A Lindberg gas-fired tempering furnace with a 16-in. diam by 35-in. depth pot is used for tempering such parts as gears, studs, pins, rollers, shafts, and cams which have previously been hardened. A gas-fired cyaniding pot, 12-in. diam by 16-in. depth, is being employed to case harden such small parts as pins, studs, gears and grippers. When selective hardening is required on these small parts, a gas-fired lead pot is available.

Each new addition to the Miehle line must meet exacting requirements. It must be capable of producing high quality printing. It must give greater production than existing comparable equipment. It must have simple, convenient, time-saving adjustments. It must have traditional Miehle dependability. Gas is helping to maintain this tradition at the Miehle plant. * * *

Various parts such as gears, studs, pins, rollers, shafts, and cams which have been previously hardened are put into this gas-fired furnace for tempering.



Operator is shown putting cyanide in a gas-fired cyaniding pot used for case hardening small pins, studs, gears, and grippers. Directly behind operator is a gas-fired lead pot used for selective hardening of similar small parts.



Rectifier Fundamentals for Service Men

Earl L. Newmyer
Good-All Electric Manufacturing Company
Ogallala, Nebraska

WHILE A CORROSION ENGINEER usually designs a cathodic protection installation and specifies the rating of the rectifier to be used, it is often necessary, and usually desirable, to have some member of the local operating group be made responsible for regularly inspecting, maintaining, and reporting on the operation of the rectifier. He may also help install it.

The following discussion is intended to help a non-technically-trained man to understand the essential operation of a rectifier used for cathodic protection, and covers some of the more important points to be considered during installation, routine servicing, and trouble-shooting.

I. Basic Function or Purpose of a Rectifier

A. Any rectifier
   1. To permit the conversion of a-c power into d-c power.

B. Cathodic protection rectifier. Same as the above, plus:
   1. Provide means of adjusting the output of the rectifier to compensate for:
      a. Seasonal system changes.
      b. Addition of more structure to be protected.
      c. Line voltage changes.
      d. Aging of the rectifier elements.
      e. Errors in system designing.
   2. Provide means of checking the output of the rectifier, so that changing conditions may be noted and provided for.
   3. Provide means of protecting the entire unit from:
      a. Overloads.
      b. Short circuits.
      c. Lightning (in some areas).
      d. Curious people (beware of leaving an "attractive nuisance" accessible).
      e. Small (and big) boys with target rifles.
      f. Weather.

II. Circuitry and Performance of a Cathodic Protection Rectifier

A. Components from input to output:
   1. Magnetic circuit breaker, thermal overload protector, or fused switch.
   2. Line voltage change over connections (optional).
   3. Two-winding transformer, with taps (or auto-transformer).
      a. Isolates input and output.
      b. Permits output voltage adjustment by means of fine and coarse taps in either or both secondary and/or primary.
   4. Secondary current overload protector (optional).
   5. Rectifier stacks (selenium, germanium, or silicon).
   6. Filter (optional).
   7. Meters to measure d-c output.
   8. Output lugs. (sometimes multiple)

B. Summary of performance
   1. Rectifier is essentially a constant voltage machine and the current obtained is therefore determined by the external system resistance.
   2. Rectifiers are quite sensitive to overloads of either current or voltage. These should be guarded against.

III. Installation

A. Location selection.
   1. Primarily dependent on soil conditions, protection requirements, and availability of power.
   2. Wherever feasible, should be in inconspicuous or protected, easily accessible location.

B. Uncrating
   1. Check thoroughly for shipping damages.
      a. Inspect case and all components.
      b. Open rectifier and check all connections.

C. Hook-up. Must conform to local codes.

1. Obtain and study thoroughly a copy of the instructions and wiring diagram furnished with the machine. A copy of both should be left with the machine, and another should be on file in the engineering office.
2. Check line voltage setting.
3. Set voltage adjustment to fairly low point, then raise until desired output is obtained (do not operate oil-immersed units more than a few minutes without oil).
4. Check for efficiency.

IV. Inspection and Maintenance

A. Consult instruction book.

B. Should be on a regular, fairly frequent schedule, to be determined by conditions.

C. **Should** include:

1. Checks and **reports** on:
   a. d-c voltage and current output.
   b. a-c watts input (may be measured directly with an a-c wattmeter, or from the a-c watt-hour meter over a period of a few minutes, and calculated thus:

$$\text{watts} = \frac{K \times N \times 3600}{T}$$

   Where K is the meter constant (shown on the dial face), N is the number of revolutions of the meter disc, and T is the time of measurement in seconds.
   c. Condition of the machine.
2. Cleaning dust and trash from all cooling air screens and ducts.

D. May also include:

1. Efficiency checks:

$$\text{Efficiency} = \frac{\text{d-c volts} \times \text{d-c amps} \times 100\%}{\text{a-c watts}}$$

   a. When new, and at full current, should run about as follows:
      (1.) For three-phase, from 80 percent at 25-v d-c down to 50 percent at 5-v d-c.
      (2.) For single phase, from 60 percent at 15 v d-c down to 40 percent at 5-v d-c.
      (3.) Single phase unit with filter may run 10 to 20 percent higher.
   b. As the stacks age, over a period of months or years, efficiency will drop.
2. Stack voltage drop checks:
   a. Procedure:
      (1.) Shut off machine and disconnect the d-c cables.
      (2.) Change voltage adjustment to lowest setting (turn machine on and check to see that this is no more than 10 percent of maximum)
      (3.) Shut machine off again and connect the output terminals together tightly with a short, heavy piece of cable.
      (4.) Turn machine on, and if necessary, adjust again to obtain rated d-c current output.
      (5.) With an a-c voltmeter, measure the secondary voltage applied to the stacks. This should be some multiple of about 2.5 v when new.
   b. Conclusions
      (1.) As the stack voltage drop increases, efficiency decreases.
      (2.) Eventually a point will be reached at which it will pay to replace the stacks with new ones.
3. Stack leakage current checks:
   a. Procedure:
      (1.) Open-circuit the output terminals.
      (2.) Insert an a-c ammeter in series with the secondary.
      (3.) Turn machine on, and run adjustment up until rated d-c output voltage is obtained.
      (4.) Allow a few minutes for stabilization before reading the a-c ammeter. It should show no more than about 5 percent of rated d-c current when new.
   b. Conclusions:
      (1.) As the leakage increases, efficiency decreases.
      (2.) More important, a rapid increase indicates the stacks are aging rapidly and may fail soon. Replacements should be obtained and stocked.

V. Trouble-shooting

As with almost any piece of electrical gear, this is best accomplished by a process of elimination. Here, again the wiring diagram and instructions should be studied.

A. If no output voltage or current is obtainable at all, difficulty and remedy may be:

1. Breaker tripped (or fuse blown).
   a. If apparently due to steady overload, reduce output slightly.
   b. If breaker trips repeatedly even with output reduced, cause may be:
      (1.) Short circuit (line-to-line or line-to-ground in some component). Isolate component, then check insulation with ohmmeter or "Megger."
   c. If breaker trips occasionally for no obvious reason the cause may be:
      (1.) Temporary overload due to soil moisture changes.
      (2.) Line voltage surges. Adjust rectifier for operation at higher line voltages.
      (3.) Intermittent short circuits. Isolate and check with a "Megger."
      (4.) Sun heat, on thermal elements. Install a shade or shield.
      (5.) Thermal elements or magnetic coils too small for the job.
2. No a-c line voltage — use a-c voltmeter of proper range to check.
3. Open circuit in some component or connection.
   a. Check all connections, especially:
      (1.) a-c line voltage selector.
      (2.) Fine and coarse transformer taps.
      (3.) Stack connections.

b. Rectifier stacks. Use a-c voltmeter to see that there is voltage being applied to the stacks.

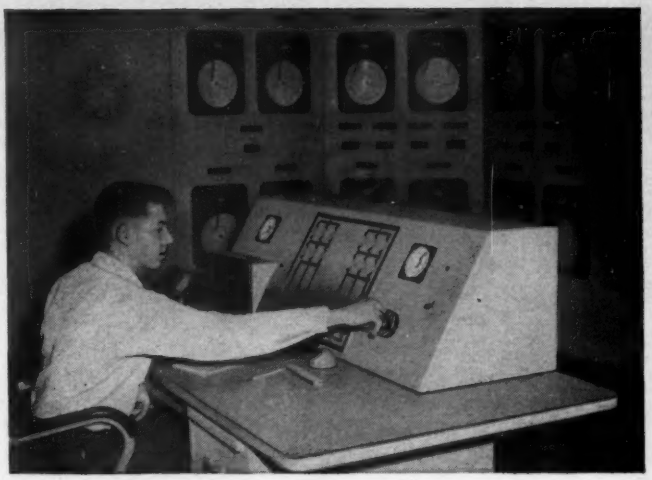
(1.) If so, they may be open circuited and should be checked further with an ohmmeter, and possibly replaced.

(2.) If not, something farther up is open.

4. Meters defective:
   a. Use accurate portable d-c meters to check them.
   b. Replace meters (or meter switches) if indicated.
5. Transformer defective. If a-c line voltage is applied to the primary, but none is measurable at the secondary, check to see if there is an audible hum coming from the transformer.
   a. If so, the primary is operating, but the secondary is probably open.
   b. If not, the primary is open.
   c. Check the above conclusions by isolating the transformer and checking the d-c resistances of the windings with an ohmmeter.
      (1.) Primary should have perhaps 1 to 10 ohm resistance.
      (2.) Secondary should have 1 ohm or less.
      (3.) If either of the resistances is quite high, the particular winding is effectively an open circuit, and the transformer will have to be repaired or replaced. **Make sure** that the high resistance is in the winding, and not in some connection lug.
6. Breaker (or thermal overload protector) defective. If the contacts don't close, they (or possibly the entire unit) should be replaced.

B. If maximum d-c output voltage obtainable at rated d-c current is only about half what it should be, trouble may be:
1. Machine connected for higher line voltage than that on which it is being operated.
2. Half of the stacks open-circuited, making the machine operate as a half-wave rectifier, instead of a full-wave one.
3. Stacks aged badly.
4. Improper transformer used. The maximum a-c secondary voltage obtainable should be at least 1.2 times rated d-c output voltage for single-phase machines, and 0.8 times for three-phase. It may run considerably higher in some machines.
5. In a three-phase machine, in addition to the above, one phase may:
   a. Be open circuited, in which case the current in one a-c line will be 10 percent or less of that in the other two.
   b. Have stacks that are aging more than the others, in which case the line current unbalance may be 10 to 50 percent or so. The defective stacks may be isolated by opening the secondary of each phase in turn, then checking the stack drop of the remaining stacks in the same way as for single-phase.
6. Low line voltage.

* * *



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Evolution of a plant. Three new buildings under construction at the Langsdale Plant of Citizens Gas & Coke Utility in Indianapolis will bring both architectural and operational changes. New home for the utility's distribution department, training school, and customer service crews is indicated by Arrow 1. A modern, fully equipped repair garage will occupy the site at Arrow 2, while a new meter shop and storerooms will be housed in the building noted by Arrow 3. The new facilities, near completion, will provide more room for crowded departments and help centralize operations.

"WHERE GAS IS GROWING"

Distribution Developments

NEWS ABOUT CURRENT AND PLANNED CONSTRUCTION

Central Natural Gas Company, Hastings, Minnesota, has under construction 2000 ft of 4-in. mains, 12,000 ft of 2-in. mains, and 15,000 ft of 1-in. service lines, all to operate at intermediate pressure. Company crews are installing the new lines.

The Delaware Gas Company, Delaware, Ohio, has program for 1958 that includes construction of approximately 6400 ft of 6-in. mains, 820 ft of 4-in. mains, and 400 ft of 2-in. mains, plus undetermined amount of service line construction and renewal. Main construction includes both new lines and renewal of older mains. Work is being done by company crews and B. A. Gundelfinger, Inc., contractor.

Citizens Gas Fuel Company, Adrian, Michigan, has under construction 15,000 ft of 2 thru 10-in. mains in all pressure ranges, and 9000 ft of ¾ and 1¼-in. service lines; program to be completed by July 1959. All work on the system, in the city of Adrian, is being handled by company crews.

Brooklyn Union Gas Company, Brooklyn, New York, has completed some 150,000 ft of new mains on Staten Island, and has initiated natural gas service to Tottenville, Staten Island, expanding service throughout the Fifth Ward. Some 16,000 ft of 6 and 12-in. main bridged the final gap along Amboy Road through the heart of Tottenville. Another 30,000 ft of lateral mains have been completed to supply customers who have arranged for gas service. By the end of 1958, the area will have 225,000 ft of mains in place to supply customers on the island.

Alexandria, Louisiana, Municipal Gas System, has under construction in 1958 approximately 10,500 ft of 8-in. main, 5300 ft of 4-in. main, 11,700 ft of 2½-in. main, and 5200 ft of 2-in. main, all high pressure. Installation is by company crews, with all projects to be completed in 1958.

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Now, for the first time . . . an efficient Tractor-Loader that can be converted into a fast-digging Backhoe with its own 84" Backfill Blade in just a matter of minutes! Blade serves as a stabilizer when the rig is being used for digging, and the entire unit folds back onto the Tractor for driving job-to-job!

OTHER POWER-MATCHED ATTACHMENTS FOR UNSURPASSED VERSATILITY! Besides having the ability to handle complete stockpiling, digging, loading, and backfilling assignments, the Work Bull 1001 also becomes a Pick-Up Street Sweeper, Angle Dozer, Rotary Broom, Scarifier, Lift Fork, and Swinging Crane! Attachments interchange quickly and easily, because the 1001 comes equipped with three-spool valve (five spool for units intended for Pick-Up Sweeper) and has convenient quick-couplers on all hydraulic connections.

INSTANT-REVERSING, POWER, SPEED, AND MANEUVERABILITY! In addition to its unsurpassed versatility, the Work Bull 1001 features instant-reversing without shifting, 60.3-hp engine, full-time power steering, torque converter, five speeds forward and five reverse, individual turning brakes, and dozens of other years-ahead features that will increase your production and lower operating costs!

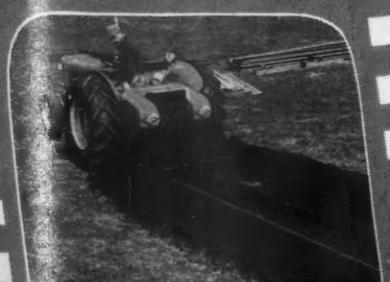
LOW PACKAGE PRICE FITS ALMOST ANY BUDGET! Despite its advanced engineering, top-quality construction, and exclusive performance features, the Work Bull 1001 is priced very low. In fact, your cost including all its power-matched attachments is less than what you are accustomed to paying for most single-use machines! Better still, you can buy just the equipment necessary for current operations . . . add attachments when you need them.

OTHER MASSEY-FERGUSON POWER-MATCHED PACKAGES include the Work Bull 202 Tractor (40 hp), Work Bull 303 Tractor (54.5 hp), Work Bull Fork Lift, Davis Loaders and Backhoes . . . plus a multitude of attachments for each basic rig.

For information on the complete Massey-Ferguson line, ask for Brochure G-4. For specific information on the Work Bull 1001, ask for Brochure W-1. Write Massey-Ferguson Industrial Division, 1009 South West Street, Wichita 13N, Kansas.

Backhoe-Backfill Blade on Work Bull 1001 digs, covers excavations without changing attachments.

75" Bucket for Work Bull 1001 has 43° tilt back, 5,200 lbs. break-away to assure full payloads.



Auburn Trencher on Work Bull 202 will dig in more adverse soil conditions than any other trencher.

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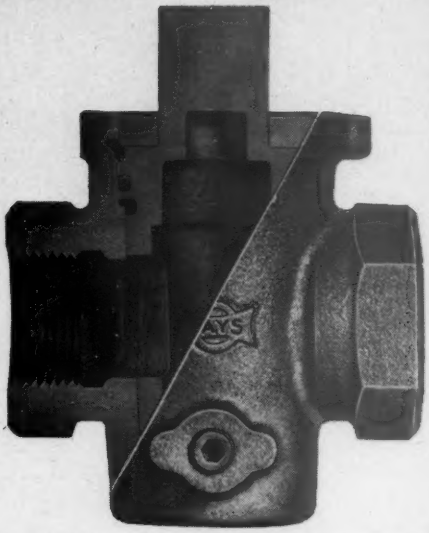

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Distribution

Arkansas Louisiana Gas Company, Shreveport, Louisiana, is building a seven town distribution system in northeastern Arkansas to serve the communities of McCrory, Patterson, Tupelo, Auvergne, Overcup, Weldon, and Shoffner. In south central Arkansas, an 18-mile distribution project is underway to serve the communities of Rison and Kingsland. A rural distribution project east of Little Rock is also underway to serve 286 new customers. Construction is being handled by company crews and by Pitts & Bryant, Inc., contractor.

Arkansas Western Gas Company, Fayetteville, Arkansas, will operate a $150,000 city-owned distribution system soon to be under construction in the community of Pea Ridge. The utility will operate the system under a lease-purchase contract.

Concord Natural Gas Corporation, Concord, New Hampshire, has under construction 2600 ft of 6-in. low pressure cast iron main, 1600 ft of 8-in. high pressure steel main, 2600 ft of 2 and 4-in. intermediate pressure steel main, and 1000 ft of 2-in. intermediate pressure steel main. All work is being done by company crews.

Pittsburgh Group Companies of Columbia Gas System *(Manufacturers Light and Heat Company, Columbia Gas of New York, Inc., Cumberland and Allegheny Gas Company, and Home Gas Company)* Pittsburgh, Pennsylvania, reports 1958 construction projects and progress as follows:

Binghampton, New York, area: For first six months of 1958, main construction involving laying of 4400 ft of 2-in., 7300 ft of 3-in., 15,000 ft of 4-in., 5600 ft of 6-in., and 1300 ft of other sizes, at an approximate cost of $110,000. For balance of the year, approximately $375,000 has been budgeted, to include construction of 24,000 ft of 2, 3, 4, and 8-in. main in Conklin Center, New York. Work on this project began in July. In the town of Owego, New York, approximately 18,500 ft of 3, 4, 6, and 8-in. is under construction. Construction in Endicott, New York, will include some 5200 ft of 8-in., and 21,000 ft of 12-in. line. Smaller projects are scheduled in various other locations in this area. Contractor in the area is Otis Eastern Services, Inc.

Beaver Valley, Pennsylvania, area: In the industrialized Beaver Valley area, north of Pittsburgh, construction totalling approximately $900,000 is planned for 1958, with some $300,000 already expended for 6400 ft of 2-in., 45,000 ft of 4-in., 8300 ft of 6-in., 4600 ft of 8-in., and 2000 ft of other sizes. Of the

remaining $600,000, about $350,000 will be expended for many small distribution line projects involving mainly 2, 4, 6, and 8-in. pipe. Two new housing developments in this area will require nearly 25,000 ft of new main, costing approximatley $146,000. This work is now under construction. Two replacement jobs also scheduled involve some 13,000 ft of 6 and 10-in. line, at a cost of $104,000. Contractor in the area is Rich and Company, Inc.

Cumberland, Maryland, area: No large distribution projects scheduled for this area in 1958; however, $290,000 is projected for many small jobs. Of this amount, approximately $116,000 has already been expended on 5000 ft of 2-in., 8900 ft of 3-in., 7500 ft of 4-in., 2600 ft of 6-in., 1200 ft of 8-in., and 150 ft of other sizes. The remaining $174,000 will be spent in a similar manner. Contractor in this area is Baughman Contracting Company, Inc.

Pittsburgh, Pennsylvania, area: This area is largely the residential and commercial portion on the south side of the city. Because of its suburban nature, most construction is on minor projects. Total cost of these projects, however, will be about $700,000 in 1958. To date, approximately $300,000 of this amount has been expended for 6500 ft of 2-in., 17,500 ft of 4-in., 22,200 ft of 6-in., 3800 ft of 10-in., 3300 ft of 16-in., and 1500 ft of various other sizes. A highway relocation project has necessitated relocation of some 9500 ft of 6 and 10-in. main. Work on this project began in June and will cost about $74,000. A replacement project underway includes 5200 ft of 4 and 8-in. line, costing approximately $77,500. Rich and Company, Inc., is contractor in this area.

Wheeling, West Virginia, area: Area includes the industrialized Ohio River Valley from Steubenville, Ohio, south to New Martinsville, West Virginia, where $600,000 has been allocated for construction of smaller distribution projects. Of this amount, $260,000 has been expended on 6200 ft of 2-in., 29,000 ft of 4-in., 9500 ft of 6-in., 4100 ft of 8-in., 1200 ft of 10-in., 1600 ft of 12-in., and 600 ft of other sizes. The remaining $340,000 will be spent in a similar manner. Five projects, to cost $275,000, are planned and include $70,000 for a 6-in. line to improve service in Wintersville, Ohio; $43,000 for an 8-in. line in Wellsburg, West Virginia; $38,600 for nearly 7000 ft of 4-in. main in West Liberty, West Virginia; $78,000 for 4800 ft of 4-in. line in Tiltonsville, Ohio; and $46,000 for 7800 ft of 6-in. line in East Liverpool, Ohio. Contractor in this area is Baughman Contracting Company, Inc.

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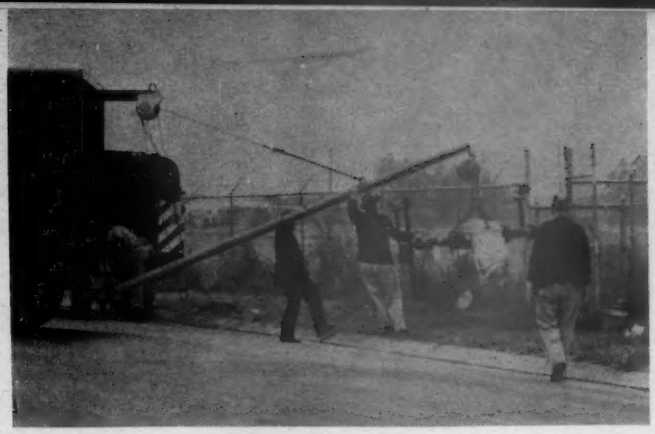

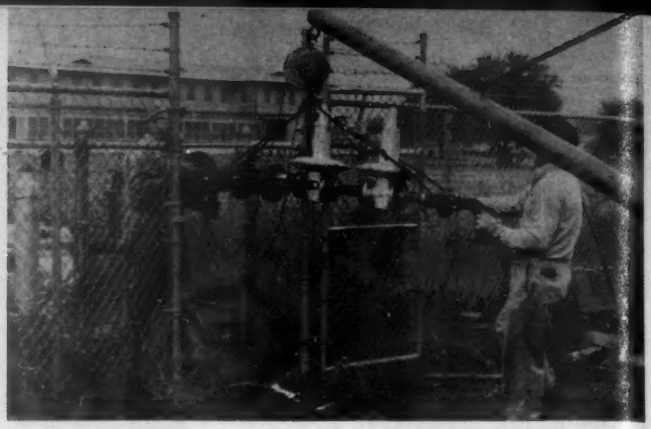

Teamwork Makes Complex Job a Routine Task

When St. Joseph Provincial House and Novitiate in New Orleans expanded, new heating boilers were added for its new buildings, increasing demand from 1200 to 6500 cu ft per hour. The increase meant that the Gas Department of New Orleans Public Service, Inc., would have to provide greater supply and metering facilities.

Teamwork exhibited by the company's various departments is symbolic of the manner in which the gas industry operates. Design for a new high pressure meter and regulating installation was quickly accomplished by the engineering department. The shop section fabricated the assembly in rapid time and turned it over to the utilization division, which made the installation.

Despite such limitations as wire fence that surrounded the installation area, and risers that couldn't be moved, the job went off without a hitch, thanks to plans carried out perfectly by each member of the team. The installation procedure is shown in the photos: (Above, left) shop section crewmen unload prefabricated meter section; (above, right) regulator header is swung into place, and (lower left) despite crowded conditions, the crew completes the installation.

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New industrial customer — Denison Engineering — required construction of 3600 ft of 6-in. main. Line will also serve customers in southern part of city.

Maze of new and abandoned lines is mark of improvements being made to Delaware Gas' system. Scene is Greenwood Lake city gate station.

Delaware Gas plans and builds for future . . .

Growing Pains Big Task for Small Utility

The past few years have brought "growing pains" to Delaware Gas Company, which serves Delaware, Ohio, a growing city of 12,000. New residential developments and industries keep springing up and each, in turn, wants dependable natural gas service.

Meeting these demands in an orderly fashion isn't easy, finds Delaware Gas. It requires careful planning and careful budgeting. Besides new main extensions, the company must also plan for construction of services, perform routine main maintenance and repair, renew older lines, and work toward completion of an "outer belt line" that will provide better gas pressure and flow on its system.

When a new residential area named "Delaware Meadows" opened up a few years back, the company laid a 6-in. low pressure (8-in. wc) main to serve it. The move paid off — the area (and connections) continue to increase. Another new housing development outside the city's corporate limits will soon receive natural gas. Construction is underway on a 6-in. medium pressure (20 psi) main that will extend some 4500 ft. Contractor B. A. Gundelfinger, Inc., is laying the line.

Extensions to serve new and expanding industries are important, too. In the past year, several industries have been added to the system, entailing construction of some 5500 ft of welded 6-in. steel main, operating at medium pressure (35 psi).

A seemingly never-ending problem facing Delaware Gas is that of main renewals. In 1902, Delaware Gas switched from manufactured to natural gas. Many of the original lines, serving both residences and businesses, are still in service and in poor condition. They must be renewed as time and budgets permit. So far this year, nearly 2500 ft of 6-in. steel main has been laid as replacement for wrought iron pipe laid as far back as 1907.

As gas utilities go, Delaware Gas Company is not big (nearly 4000 customers) but as is the case with many companies of its relative size, it is continually working to improve both its service and its physical plant.

200 ft of 6-in. main connect Sunray Stove Company, new industrial customer, to company's system.

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NEWS

ABOUT THE GAS DISTRIBUTION INDUSTRY

Highlighting PCGA's 65th annual convention September 3-5 in Portland, Oregon, will be speeches by a top atomic physicist and a White House aide. Dr. Edward Teller, world figure in atomic science who heads the University of California's radiation laboratory, and Howard Pyle, deputy assistant to President Eisenhower and ex-governor of Arizona are booked as luncheon speakers. President-elect of American Gas Association, J. Theodore Wolfe, will address the awards session, following the annual report of PCGA President Charles H. Gueffroy, who heads the host company, Northwest Natural Gas Company.

Merger of Iowa-Illinois Gas and Electric Company with Iowa Power and Light Company is being studied. Stone & Webster Service Corporation is studying the possibilities of integrating the operations, businesses, and properties of the two firms under a single corporate ownership and management. Both firms are of reasonably comparable size, serve fairly contiguous territories and in many ways are complementary to each other. Both are distributors of natural gas, with Iowa-Illinois having more gas customers than electric, while Iowa Power and Light has greater number of electric customers.

S. F. Wikstrom, director of promotion and advertising for the American Gas Association since 1955, has been named director of AGA's PAR Plan (Promotion, Advertising and Research). His appointment, effective August 1, is one of five PAR staff promotions — Wikstrom succeeds Allen D. Schrodt, who is resigning to relocate in the Southwest; Norval D. Jennings, AGA's advertising manager since 1953, succeeds Wikstrom as promotion and advertising director, and Jennings' former post will be filled by Charles R. Bowen, promotion manager for the past three years. AGA also has advanced Kenneth F. Muldoon, manager of the New Freedom Gas Home Bureau, to promotion manager; his position is being filled by Gerald P. Mullins, former assistant to the director of promotion and advertising.

General sales offices for Arkla Air Conditioning Corporation manufacturers of year-round air conditioners have been located permanently in Little Rock, Arkansas, under the direction of W. G. Wepfer, general sales manager. The manufacturing plant located at Evansville, Indiana, now engaged in the manufacture of gas air conditioning equipment and the new product, "Gaslites," remains under the direction of L. E. Walbridge, vice president of Arkla in charge of production. To meet the increasing demand for air conditioning units, W. R. Stephens, Arkla president, said, that production in the Evansville plant has been stepped up to three shifts per day, six days a week, and production is currently at the rate of 10,000 units a year.

Textile Symposium. In an effort to provide for a meeting of minds on textile processing operations in the area where heat is required, the American Gas Association and the Southeastern Gas Association are sponsoring the 2nd annual textile symposium in Greensboro, North Carolina, September 8-9. The meeting will bring together all segments of the industry for a frank and open discussion of the problems faced by producers of fabric, both natural and synthetic, textile finishers; textile machinery manufacturers; manufacturers of gas equipment suitable for textile applications, and the gas industry.

Gas Air Conditioning Sales Increase. Total of 3436 year-round residential gas air conditioning units were shipped during the first six months of 1958 as compared to 1305 units shipped during the comparable period last year, a recent AGA survey shows. More than 7000 residential unit shipments are forecast for 1958 as compared with the actual 2467 units shipped in 1957. W. W. Selzer, chairman of AGA's air conditioning committee, said the marked upturn in sales of year-round gas units resulted from increased sales promotion efforts by gas utilities, improvements in design and operation of gas air conditioning units, and to a substantial reduction in unit prices in 1958.

Streamlining for Natural Gas. Merger of Peoples Water and Gas Company of North Miami and The Tampa Gas Company into Peoples Gas System, Inc. has created Florida's largest gas utility. The new company, with assets of more than $24 million, operates manufactured gas distribution properties in Dade, Broward, and Hillsborough counties, serving more than 100,000 customers. Prior to merger, North Miami and Tampa were affiliates of Peoples Gas System. "The merger," Phillip C. Crowen, president, said, "is the final step we had contemplated to prepare ... for natural gas. It will streamline our operations and simplify financing of some $15,000,000 of new funds we plan to spend to convert our system to natural gas and expand it to make this new fuel available to more people in Florida."

East Ohio Gas Company has awarded four-year tuition-paid scholarships to two northeastern Ohio youths to attend the Illinois Institute of Technology. The scholarships were awarded as part of East Ohio's scholarship program that is designed to meet the need for qualified engineers in the natural gas industry. In addition to college, the program includes summer employment with East Ohio.

Men Only Cooking School. The first Men Only Cooking School sponsored by Northern Illinois Gas Company was held recently at the utility's store and service office in Wheaton, Illinois. Local attorney C. J. Anderson demonstrated charcoal broiling techniques he utilizes in his hobby of preparing about 2000 steaks each year for various civic groups. E. Carl Sorby, vice president of George D. Roper Corporation, showed new innovations in food preparation with natural gas.

Arkansas Louisiana Gas Company took top place in the United States Chamber of Commerce annual economic understanding competition. Arkansas Louisiana was among more than 100 business firms that competed in the 1957 economic understanding awards program. Contest entries were divided into 5 groups, based on number of employees, and ALG was national winner in its category. The program is designed to recognize achievement in developing better understanding of the operation of business and the economic system. Basis of judging was the most effective use of employee communication media.

National Cylinder Gas Company has changed its name to Chemetron Corporation. Continuing diversification and expansion have made obsolete the company's old name. Now, one of the firm's seven divisions will bear the "National Cylinder Gas" name. Chemetron is a contraction for the names of three of the many industries served by the company — chemicals, metals, and electronics.

For uniform identification, Hope Natural Gas Company is installing modern Scotchlite reflectorized signs at some 88 installations throughout its operating territory in West Virginia. Most of the signs range in size from 2 ft square to the larger 4 by 8 ft. The larger billboard type sign, of which there are three, will be installed at two compressor stations and a central warehouse near Clarksburg. Finished in silver, blue and gold, the signs are 180 times brighter than standard white enamel-on-steel markers and require no illumination at night. They have life expectancy of more than five years and require no maintenance.

Ground was broken recently on a 13-story, $2 million headquarters building for Southern Counties Gas Company of California in downtown Los Angeles. The structure will go up on a 50-by-150 ft lot and is scheduled for completion by August 1959. It will house, in addition to Southern Counties Gas Company, offices of two affiliates, Southern California Gas Company and Pacific Lighting Gas Supply Company, and local executive offices of the parent organization of the three Southland utilities, Pacific Lighting Corporation. (Left to right) Guy W. Wadsworth Jr., president, Southern Counties Gas Company, Robert A. Hornby, president Pacific Lighting Corporation, and Burton C. Rawlings, president of the Downtown Business Men's Association, are shown officiating at the groundbreaking ceremonies.

ADVERTISERS INDEX

American Cast Iron Pipe Company....—
American Liquid Gas Company.....—
American Meter Company.....11, 37
American Meter Company, Reliance Regulator Division.....16
Aqua Survey & Instrument Company..—
Arkla Air Conditioning Corporation..—
Barber-Greene Company .....—
Blaw-Knox Company, Buflovak Div. .....Inside Front Cover
Chaplin-Fulton Manufacturing Company 2
Cleveland Trencher Company, The....41
M. J. Crose.....—
Deere & Company.....43
Drake & Townsend, Inc.....43
Dresser Industries, Inc.....—
Dresser Manufacturing Division.....15
Empire Gas Engineering Company....43
Fisher Governor Company.....—
Greenlee Tool Company.....—
H & M Pipe Beveling Machine ..... Company .....—
Hays Manufacturing Company.....40
Johns-Manville .....—
Kimray, Inc. .....—
Joslyn Manufacturing & Supply Co....—
Lancaster Meter Parts Co.....—
Librascope, Incorporated .....—
Lone Star Steel Company..... 9
Massey-Ferguson Industrial Division, M-H-F, Inc. 39
May Company 42
Midwestern Pipeline Products.....—
Moonglow Gas Light Co.....—
Mueller Co. 6, 7
Nibco, Inc. .....—
Norton-McMurray Manufacturing Company .....—
Norwalk Valves .....—
Oronite Chemical Company 4
Pittsburgh Coke & Chemical Company, Protective Coatings Division 8
Professional Directory 43
Reynolds Gas Regulator Company....47
Robertshaw-Fulton Controls Co. .....Inside Back Cover
Rockwell Manufacturing Company, Products Division .....—
Rockwell Manufacturing Company, Nordstrom Valve Division .....Front Cover
Safety Gas Main Stopper Co., Inc....12
Sheehan Pipeline Construction Co.....—
Sherman Products, Inc.....—
Skinner, M.B., Company 13
Somerville Construction Company....—
Southern Cross Foresters.....12
Southwestern Industrial Electronics....—
Sprague Meter Company, The ..... Back Cover
Standard Pipe Protection, Inc.....—
Superior Meter Company.....14
Tenecoat Company .....—
United Engineers & Constructors, Inc.. —
Universal Controls Corp.....12
Vermeer Manufacturing Co.....10
Wilkinson Products Company.....45
William Wallace Company.....—

THIS INDEX IS PROVIDED AS AN ADDITIONAL SERVICE FOR OUR READERS—THE PUBLISHER ASSUMES NO RESPONSIBILITY FOR ERRORS OR OMISSIONS

BOOKSHELF

Management for Engineers, *by Roger C. Heimer, published by McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York. Pages, 453. Price, $6.75.*

The engineer engulfed hour by hour in problems that have precise mathematical answers is frequently not conversant with the economic, social, psychological, and political complexities of management. These subjective concerns greatly affect and often completely dominate the decisions of business management and are therefore given studied attention in this new book. Briefly, the scope of the book includes a practical look at the impact of costs, standards, materials, methods, taxes, insurance, power, equipment, labor, and ethics; and shows the relationship between them and engineering considerations.

People at Work: The Human Element in Modern Business, *published by the American Management Association, Inc., 1515 Broadway, Times Square, New York 36, New York. Pages, 195. Price, $5.25.*

New developments in employee selection, training and supervision emphasize the individual's role in the company and stress personal relationships and attitudes that are vital to business. AMA Management Report 1 shows how leading companies are making practical applications of this increased concern with human relations. Company representatives discuss such topics as more effective use of engineering and technical personnel, approaches to racial integration in industry, master union contracts, and wage and salary policies.

1954-1955 Bibliographic Survey of Corrosion, *compiled by A. Irene Humphrey, published by National Association of Corrosion Engineers, 1061 M & M Building, Houston 2, Texas. Pages, 468. Price, $20.00.*

A selection of 4287 abstracts of articles on corrosion and corrosion prevention published in 1954-1955 have been compiled in this volume. Also included are a number of abstracts published from 1945 to 1953 which were not available for use in earlier bibliographies. Material was selected from abstracts compiled by 23 agencies covering literature internationally. Abstracts are arranged topically according to the NACE Abstract Index which divides the literature into eight main groups: General, testing, characteristic corrosion phenomena, corrosive environments, preventive measures, materials of construction, equipment and industries.

The Heating Ventilating Air Conditioning Guide 1958, 36th ed., *published by the American Society of Heating and Air Conditioning Engineers, 62 Worth Street, New York 13, New York. Pages, 1775. Price, $12.00.*

New guide contains a 1272-page technical data section and a 503-page catalog data section. The technical data section has been expanded to include newly available technical data in the many chapters including: Air contaminants; cooling load; fuels and combustion; automatic fuel burning equipment; heating boilers; furnaces, space heaters; radiators, convectors, baseboard and finned-tube units; central systems for air conditioning; air duct design, air cleaning; refrigeration; electric heating; industrial exhaust systems; industrial drying systems, and codes and standards. Revisions and additions include the addition of both a description and a design method for high velocity air duct systems, an enlarged section on the heat pump, new information on exhaust hood performance and design for hot and cold processes.

Design of Domestic Gas-Fired Incinerators for Elimination of Smoke, Odor, and Fly Ash, *AGA Laboratories Research Bulletin 78, published by American Gas Association, 420 Lexington Avenue, New York 17, New York. Pages, 86. Price, $3.00.*

Incinerator design factors developed and demonstrated for attaining smokeless, odorless, fly ash free effluents without hazard of excessive temperatures in effectively burning all types of domestic combustible wastes are described in new research bulletin. Five manufacturers of the several who cooperated in the research project are now ready to supply new models capable of the desired performance.

THE NEW MINIATURIZED

WILKINSON Line Locator Model W-3

This radically new, powerful transistorized sub-surface locating instruments weighs only four pounds and is one-fourth the size of conventional pipe locators.

It is as handy as a flashlight; the maintenance is trivial; the non-leak miniature batteries last ten times longer. Transistors never require replacement. Molded glass fibre cass. Transistor ear set. Telescope aluminum handle. Etches circuitry and unique antenna.

WILKINSON PRODUCTS COMPANY

3987 Chevy Chase Drive, PASADENA 3, CALIFORNIA. SYlvan 0-4314

Product Previews

FOR THE GAS DISTRIBUTION INDUSTRY

For more information on items described here in brief, use the handy reply card and circle the corresponding numbers

Two-Way Radio. General Electric has announced a revolutionary add-on 250/330 watt economy power package that promises substantial savings to two-way radio owners who need greater communications range. known as the "Power-Mate," the package enables users of lower power range transmitters to upgrade their present systems to as high as 330 watts at half the cost they normally would pay for a complete 330 watt station. *General Electric Company.*

CIRCLE (1) ON THE REPLY CARD

Pipe Locator. New transistor pipe locator and metal detector is being marketed by Gardiner Electronics. Unit uses a total of eight transistors, one in the transmitter and seven in the receiver; uses only four flashlight batteries, two in the transmitter and two in the receiver. The two flashlight batteries in the receiver will last 3000 hours and the two in the transmitter 350 hours. Unit has metal cased boxes, with baked-on paint finish and printed circuits. Comes equipped with a drop handle. *Gardiner Electronics Company.*

CIRCLE (2) ON THE REPLY CARD

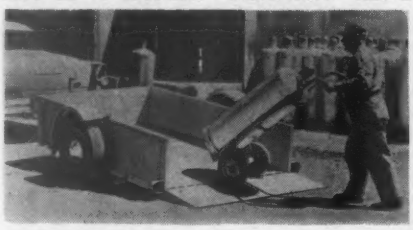
Pipeline Padding Machine. The CRC ditch padding machine, adaptable to any standard ¾ cu yd dragline, has been proved by extensive field tests. Though recently invented, the machine has undergone major improvements which far surpass the original design. It consists of an endless steel wire grid, 6 ft wide, rotating on a shaker track system which loosens dirt from rocks in the spoil. A backfill bucket drags the spoil onto the grid which is suspended across the ditch by the dragline boom. Fine dirt is shaken through the grid and onto the pipe, while all rocks larger than the grid openings are conveyed across to the working side of the ditch. Even damp earth is sifted through the grid by the shaker system. By eliminating dirt hauling, the machine makes padding a profitable operation. The dragline operator controls and operates the machine from his cab chair. *Crutcher-Rolfs-Cummings, Inc.*

CIRCLE (3) ON THE REPLY CARD

Plastic Pipe. New rigid plastic pipe that can be used at higher operating pressures and temperatures than other thermoplastic plastic pipe has been added to the Carlon line. The new HTHT pipe is made from an improved Kralastic resin development by United States Rubber Company which enables the HTHT to be used at temperatures as high as 180 F. Its high tensile strength allows working pressure ratings averaging 100 psi above other rigid plastic pipe of the same IPS size. Higher working pressure ratings mean that pressure-rated sizes will be lower in cost than existing Kralastic pipes. Pipe is available in sizes from ½ through 6-in., for working pressures of 100, 125, 150 and 200 psi, and also in Schedule 80 IPS for working pressures to 500 psi. *Carlon Products Corporation.*

CIRCLE (4) ON THE REPLY CARD

Elevating Cargo Trailer. Magline, Inc. has introduced an elevating trailer for all-purpose cargo handling that lifts its own load in 40 seconds. "Trailevator" has a



hydraulically operated bed that lowers to receive load at ground level, then lifts and locks into hauling position. Features include a patented load leveling device to compensate for non-uniform load distribution, assuring level elevation or descent. Independent wheel suspension and dual leaf-type springs provide shock-free over-the-road cargo hauling. Tailgate forms heavy-duty loading ramp as well as secure box closure. Rated at 2000 lb capacity, with ample safety factor, unit is of all-steel construction and weighs only 960 lb. *Magline, Inc.*

CIRCLE (5) ON THE REPLY CARD

Fenders. Streamlined master contour fenders of single piece construction for trucks and trailers are now available from Master Tank & Welding Company. These hi-strength, 16-gage steel fenders feature a 2-in. curved edge for better splash control and single piece construction that can not separate, and eliminates rattles and dust. Fenders are finished with a rust proof prime coat and come equipped with bar and bolts ready to mount. They are available for dual, tractor, trailer, and step-down equipment. *Master Tank & Welding Company.*

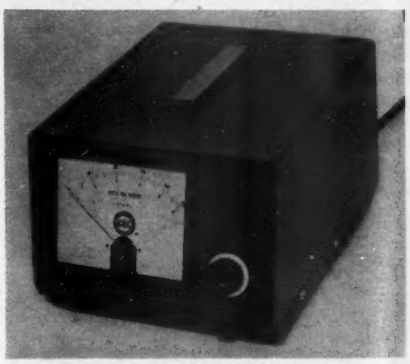
CIRCLE (6) ON THE REPLY CARD

Hoists. Master Pneumatic Tool Company has announced a new series of air-powered hoists that have lifting capacities of 1000 and 2000 lb. Designated the Master Power No. 105 series, these hoists utilize either link or roller type chain, both of which can be fitted with either manual throttle control or pendent control. Other features include weight of only 27 lb and rate of lift at 46 ft per min with 1000 lb at 90 psi. *Master Pneumatic Tool Company, Inc.*

CIRCLE (7) ON THE REPLY CARD

Wheel-Type Loader. New J. I. Case Model 420 low-priced wheel-type loader has torque converter drive, shuttle transmission, power steering, cushioned reversible seat, and cast iron counterweight as standard equipment. Secret of the new tractor's power is a torque converter drive that actually doubles push-power at the all-important low working speeds, a feature that was formerly available only on larger, more expensive wheel loaders and crawler tractors. A 21 gal per min hydraulic pump and 25-deg rollback develop 4600 lb of breakout force. Bucket can lift full 2000-lb loads to clear 11 ft 4 in. height in 7½ seconds — without spillage. *J. I. Case Company.*

CIRCLE (8) ON THE REPLY CARD

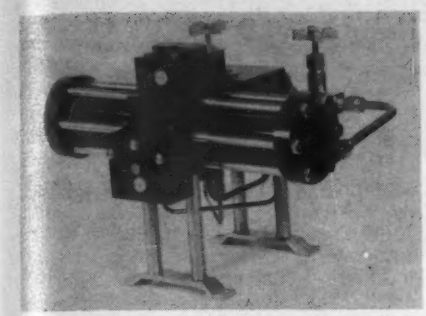


Moisture Monitor. Consolidated Electrodynamics has developed a new, wide-range, low-cost instrument for accurately measuring minute quantities of moisture in gaseous mixtures. Called the Type 26-302 Moisture Monitor, the unit measures water content accurately down to 10 ppm full-scale, and permits precise meter readings over the range of 0-20,000 ppm by means of a 6-position attenuator. Output of the analyzer can be telemetered to a remote recorder for monitoring or control. *Consolidated Electrodynamics Corporation.*

CIRCLE (9) ON THE REPLY CARD

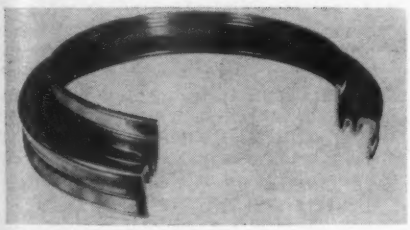
Low Speed Rotary Air Compressor. Le Roi has announced a new 365 cu ft per min portable rotary air compressor that has an air compressor speed of only 1100 rpm. This is the second of a new line of rotary air compressors. It is a portable, two-stage, oil-cooled, sliding vane type compressor rated at 365 cu ft per min of free air compressed to 100 psi. Compressor is coupled to a GM 471 diesel engine with a hydraulically actuated clutch. Engine speed at rated output of compressor is 1650 rpm. *Le Roi Division, Westinghouse Air Brake Company.*

CIRCLE (10) ON THE REPLY CARD



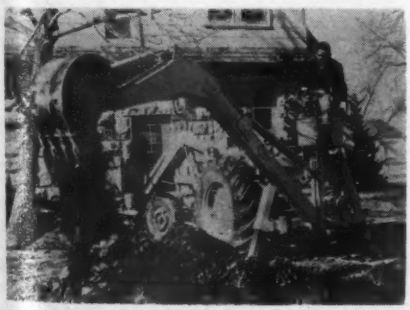
"PV" Series Glycol Pump. Kimray, Inc. has announced a new check valve system for the new "PV" series glycol pump. All check valve piping has been eliminated through use of two check valve blocks which house the suction and discharge checks required for the double action principle. Pump is used for circulating glycol in a closed system, gas dehydration unit. The power source is wet glycol and a small quantity of gas at absorber pressure. Advantages in new pump design include elimination of high pressure liquid level controllers on the absorber since the pump discharges wet glycol from the absorber; packing that prevents loss of glycol; check valve darts "cushioned" to prevent hammer effect. Pumps have capacities of 17, 40, 90, and 210 gal per hour. *Kimray, Inc.*

CIRCLE (11) ON THE REPLY CARD



Molded Casing Seal. The Maloney molded casing seal is the third in a series of casing seals manufactured by F. H. Maloney Company. The rubber compound has been especially formulated to withstand abrasion from backfill during construction, and severe aging in use. A double convolute in the bellows section of the seal allows ample room for eccentric installations as well as extreme longitudinal shift of the carrier within the casing. Triple-thick walls at shear and pressure points eliminate need for special rock shielding of the seal. Ribbed inner surfaces and stainless steel banding insure an impervious seal with long life. Available in range of carrier-casing size combinations. *F. H. Maloney Company.*

CIRCLE (12) ON THE REPLY CARD

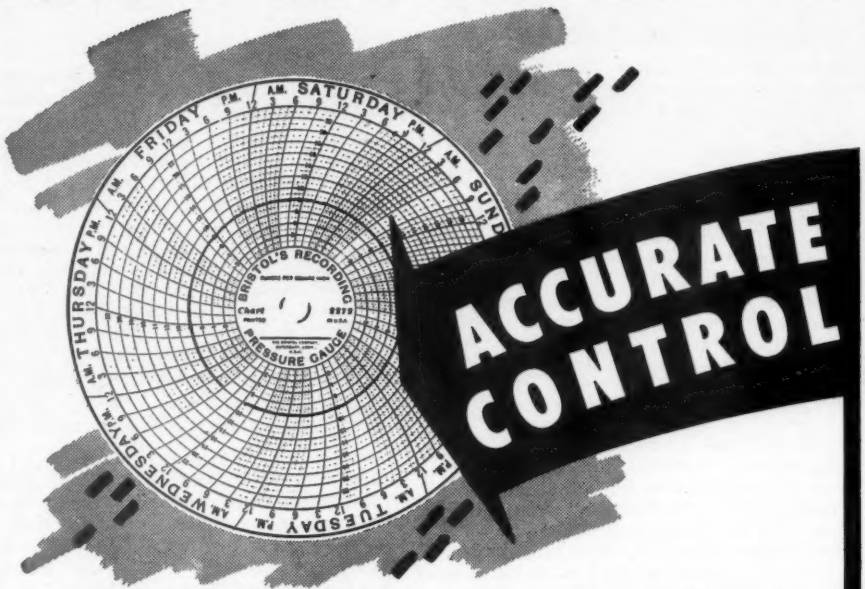


Big Muscle Backhoe. One of Ottawa's new line of backhoes and front end loaders now available for various makes of tractors at lower cost than previous models, is the new model LX Ottawa backhoe. Unit digs to a depth of 12½ ft in any position of 190 deg continuous arc of swing. Outriggers, boom structure, and mechanism are supported by an A-frame which is constructed of boxed sections, electric welded to form an extremely rigid foundation for digging and loading at any angle up to 95 deg right or left from centerline of tractor. Turret type sea pivots with boom, and is offset so operator can see without leaning. A 4-point hitch makes it possible to attach backhoe to tractor in five minutes. Exclusive patented feature of Ottawa backhoes is an ejector bucket that automatically forces all wet, sticky material from the bucket during dumping cycle. *Ottawa Steel Division.*

CIRCLE (13) ON THE REPLY CARD

Electrode. Lincoln Electric has announced a new electrode to reduce the cost of general production and maintenance welding. The design of the electrode coating, which includes addition of iron powder, makes the electrode easier to operate and faster than previous E-6012 designs. The electrode is classed as an all-position a-c and d-c mild steel electrode. Features include excellent operation on a-c, even with low, open circuit voltage machines; increased deposition rate and electrode "mileage"; soft, easy handling arc; medium penetration; reduced spatter; smooth bead appearance; easy slag removal and good operation at low currents. Electrode is available in ⅛, 5/32, and 3/16-in. sizes. *The Lincoln Electric Company.*

CIRCLE (14) ON THE REPLY CARD



Reynolds Service Regulators are built to meet specific requirements — years of operation in the field through a complete range of operating conditions have proved not only their superiority but their durability. With parts so precisely machined for each model that they are completely interchangeable. The accuracy you require in performance is assured.

MODEL 10

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30

For horizontal or vertical connections, with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal or diaphragm operated relief valve.

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.
GAS CONTROL SINCE 1892

Bulletin Board

NEW BOOKS...BROCHURES...CATALOGS

For more information on items described here in brief, use the handy reply card and circle the corresponding numbers

Gas Engines. Three new fliers describe in detail Ingersoll-Rand's line of 4-cycle, V-angle gas engines designed for supplying power to industry. Three models of these gas engines are built. They are the PJVG with a range of 220-295 hp; the medium-sized PSVG with a range of 408-816 hp; and the large PKVG, which has 880-1760 hp range. Essentially they are the same engines built in Ingersoll-Rand's well-known JVG, SVG, and KVG gas engine compressors. Engines are well-suited as prime movers for pumps, blowers, and other equipment, as well as driving alternating current generators. *Ingersoll-Rand.*

CIRCLE (61) ON THE REPLY CARD

Backhoes and Loaders. Ottawa's new "Big Muscle" backhoe that digs 12½ ft deep in any position of 190 deg arc, is described in a new 4-page bulletin, complete with photographs and specifications. New Ottawa Model U loader, designed as a companion tool for the LX backhoe, is described in a separate 4-page folder. Both attachments mount on many makes and models of wheel tractors, and operate from one hydraulic system. Backhoe also mounts on crawler tractors and integrated loadster units. *Ottawa Steel Division, Young Spring & Wire Corporation.*

CIRCLE (62) ON THE REPLY CARD

Guide for Speakers. AGA Public Information Bureau has prepared a new "Speakers Kit" to assist gas companies organize and conduct speakers bureaus to promote public relations in their communities. The 16-page how-to-do-it booklet, titled "Face to Face," gives suggestions for setting up a speakers bureau and practical pointers on how to get started, methods of selecting and training company speakers, and suitable subject matter and techniques. Sample speeches are also included. *American Gas Association.*

CIRCLE (63) ON THE REPLY CARD

Tractor Shovel. New 4-wheel drive, rear-wheel power-steer tractor shovel, designated W-9 Terraload'r, is featured in Case Bulletin CTS-111. Specifications and illustrations of job applications are included. The 12-page, 3-color catalog shows interchangeable buckets from 1¼ cu yd to 2¾ cu yd, for digging or handling various types of materials. Operating advantages of balanced design, which takes into account fore-aft and lateral weight distribution, as well as power requirements, are explained and illustrated. *J. I. Case Company.*

CIRCLE (64) ON THE REPLY CARD

400 Cycle Induction Heating. New folder describes a 400-cycle induction heating generator and tells how it simplifies the preheating and stress relieving of arc welded joints. The generator, which supplies 400 cycle alternating current to a wire induction heating coil, is automatically operated by an electronic strip chart program controller. Any planned program of preheating, soaking, and cooling is automatically controlled and a permanent record of every phase of the program is recorded on a strip chart. *Hobart Brothers Company.*

CIRCLE (65) ON THE REPLY CARD

Lockers, Cabinets, Shelving. New envelope-size folder describes, illustrates, and gives prices for Penco's line of steel lockers, cabinets, and shelving. Titled "Penco Lockers-Cabinets-Shelving," folder presents the most popular style lockers and cabinets and gives sizes available. Typical examples of open and closed-type plain and ledge shelving are described with prices per 3-ft sections. Design and construction advantages of each type of storage equipment is also included. *Penco Metal Products Division, Alan Wood Steel Company.*

CIRCLE (66) ON THE REPLY CARD

Lift Trucks. Complete catalog of Little Giant mechanical and hydraulic lift truck attachments illustrates 26 ways for owners to get more use from their lift trucks. Many attachments are designed for use with forks and other for carriage mounting. Examples of what attachments can do include handling drum, barrel, cylinder, roll and bales; sweeping plant and yard, and extending lift truck mast height for forks. *Little Giant Products, Inc.*

CIRCLE (67) ON THE REPLY CARD

Meter Tube Catalog. New 20-page catalog Section "D" details features and specifications of Daniel Flangnek Standard Meter Tubes. Formerly custom items, these meter tubes can now be ordered as standardized components of oil and gas flow-measurement systems direct from the Daniel Catalog. Using the Daniel system of pre-engineered meter tube selection, it is necessary to know only the size, catalog number and plate bore. *Daniel Orifice Fitting Company.*

CIRCLE (68) ON THE REPLY CARD

Handbook of Safety Codes. New Fire Equipment Manufacturers Association handbook outlines various procedures for maintaining, protecting, recharging, and inspecting fire extinguishing equipment commonly used throughout the gas industry. The 8½ by 11-in. 42-page brochure presents both mandatory and recommended procedures to be followed to assure service from portable fire extinguishers, carbon dioxide, and other systems. *Fire Equipment Manufacturers Association.*

CIRCLE (69) ON THE REPLY CARD

Mobile Radio Equipment. General Electric has issued a 16-page booklet entitled "Under the Influence of Radio." Written in non-technical language, booklet shows numerous ways radio is useful to drivers and it illustrates benefits accrued by customers of those whose cars and trucks are radio-equipped. Information on licenses for base stations, mobile units, and for drivers as well as instructions concerning equipment adjustments, how to send a message, and maintenance are included. *General Electric Company.*

CIRCLE (70) ON THE REPLY CARD

Heat Treat. Surface Combustion's new 8-page "Heat Treat Review" features the totally automated heat treat operation of Timkin Roller Bearing Company of Columbus, Ohio. Also included in the periodically issued review are illustrated articles on continuous strip heat treatment, mechanized sintering furnace, and economical small parts processing. *Surface Combustion Corporation.*

CIRCLE (71) ON THE REPLY CARD

Magnetic and Motorized Valves. New 24-page catalog illustrates and lists specifications of magnetic and motorized valves for use with gas, air, water, steam, oil and refrigerants. Solenoid coil rating tables are given and two flow charts — one for liquids, the other for compressible fluids — highlight the catalog. Dimensional drawings are also included. *The Mercoid Corporation.*

CIRCLE (72) ON THE REPLY CARD

Recording Annunciator. New 4-page two color bulletin describes and illustrates Panellit's new model RA recording annunciator which accurately records off-normal and on-off operations without complicated decoding. Advantages cited are reduced down-time, and increased operating efficiency as unit monitors equipment operations accurately, and reliably. Unit installs separately or with an existing annunciator. *Panellit, Inc.*

CIRCLE (73) ON THE REPLY CARD

Fork Lift Trucks. "Be Years Ahead with Allis-Chalmers Fork Lift Trucks" is title of new 16-page, 2-color catalog now available from Engine-Material Handling Division of Allis-Chalmers. Catalog covers the FT series of lift trucks, telling the engineering, design, construction, and operating story of the units. Illustrations show features of the trucks and the Allis-Chalmers engine powering them. *Allis-Chalmers Manufacturing Company.*

CIRCLE (74) ON THE REPLY CARD

Combustible Gas Indicators. Complete, detailed description of the operating principles of gas indicators are given in booklet offered by Davis Emergency Equipment Company. Proper method of selecting instrument to do desired job, training of personnel in use of the indicator, and testing procedures to keep instruments operating accurately are given. Information contained is basic, and applies to all makes of instruments. *Davis Emergency Equipment Company, Inc.*

CIRCLE (75) ON THE REPLY CARD